

Influence of methane and carbon monoxide in the volumetric behaviour of the anthropogenic CO₂. Experimental data and modelling in the critical region.

Clara Rivas, Sofía T. Blanco, Javier Fernández, Manuela Artal, Inmaculada Velasco*

Departamento de Química Física, Facultad de Ciencias, Universidad de Zaragoza, 50009 Zaragoza, Spain.

Abstract

Density measurements of the systems CO₂ + CH₄ at $T = 304.21$ K and CO₂ + CO at $T = 304.21$ and 308.15 K were carried out at pressures and compositions of interest in the process of transport and storage of CO₂ (CCS Technology): $P = 0.1$ to 20 MPa, and $x_{\text{CO}_2} \geq 0.97$. From the experimental P - ρ - T - x_{CO_2} data, we have studied the dependence of the isothermal compressibility, the excess molar volume, and the partial molar volume of the solute with composition, pressure and temperature within the critical region. We have modelled the volumetric behaviour of these systems with Peng-Robinson, PC-SAFT and GERG Equations of State, thus validating these equations under the conditions considered. Furthermore, we have confirmed the weakly attractive behaviour of these systems by performing a study of the interactions between solvent molecules, CO₂, and those of the solute, CO or CH₄, using the Krichevskii Function concept and the Kirkwood-Buff Theory. Finally, we have quantified the influence of small amounts of CH₄ and CO in the transport of anthropogenic CO₂ through several normalized parameters, related to the design and operation of the fluid transport process.

Corresponding Author. Tel.: +34976761197

E-mail: curra@unizar.es

Keywords:

Carbon dioxide

Impurities

Volumetric properties

EoS

Structural properties

CCS technology

1. Introduction

Nowadays new technologies are being developed in order to reduce CO₂ emissions originated from industrial processes. For instance, CO₂ capture by algae and subsequent transformation into biomass in a process similar to photosynthesis (Ramachandriya et al., 2013); obtaining combustible materials or other high added value substances from its photocatalytic and electrochemical reduction (Ghasemi et al., 2013); purification and treatment of drinking water (Vo et al., 2013) and food preservation, (Al-Nehlawi et al., 2013). However, the technology that will furthest reduce carbon dioxide in the atmosphere is the capture, transport and storage of CO₂ (CCS technology). According to the International Energy Agency (IEA / CSLF, 2010), the contribution of this technology to atmospheric CO₂ reduction by 2050 is expected to be of the order of 20% and the reduction achieved by greater energy efficiency of 36% (*horizon 2050*). In CCS, anthropogenic CO₂ (CO₂ from human activity) is processed in order to increase its CO₂ content (to 85 - 99.5% CO₂), then transported to a storage site and injected and stored in the chosen reservoir.

The phase diagram of a pure compound shows that at temperatures and pressures above its critical point (for pure CO₂, $P_c = 7.383$ MPa, $T_c = 304.21$ K (Gil et al., 2008)), the gas and liquid phases are indistinguishable and there is only one phase present, known as a supercritical phase, which exhibits viscosity and density values intermediate between the values of liquids and gases. If we consider that the volume occupied by CO₂ under supercritical conditions is about 350 times smaller than that occupied in gas phase, and that the viscosity under these conditions is relatively small, the most economical means of transporting CO₂ through pipelines is going to be either

as a supercritical fluid or as a dense fluid. The supercritical region lies above the critical temperature and pressure and the "dense phase region" is located above the critical pressure, but below the critical temperature.

However, the transported fluid is not pure CO₂, as it contains other compounds derived from both the emission sources and the capture and conditioning processes. The presence of these "impurities" in CO₂ changes its thermodynamic properties: the position of the critical point is affected and the line of liquid-vapor equilibrium is transformed into a phase envelope, enclosing a biphasic region; thus fluid composition determines the minimum pressure necessary to ensure transport in supercritical or dense phase. There are different reasons why transport, and, in general, any operation should be avoided under two-phase flow in this technology (Knoope et al., 2013): (i) cavitation produced by bubble implosion in the biphasic region generates shock waves which may cause cracks in the pipeline; (ii) turbulence caused by the bubbles hinder the work of compressors and pumps; and (iii) two-phase flow reduces the quantity of fluid transported. Anyway, multiphase flow conditions seem to be unavoidable at startup/failure modes. An equation of state for solid CO₂ has been recently published (Trusler, 2011; Trusler, 2012) that can be solved simultaneously with an equation for the fluid phases to obtain solid-vapour and solid-liquid equilibria, which can be of practical importance when calculating the discharge rate in the event of pipeline failure.

One of the characteristic properties of supercritical fluids in the region near the critical point is the wide variation caused in the density and compressibility values when small changes in pressure, temperature and composition occur. These

properties, in turn, influence various parameters that affect the process of transport, having an impact on the overall economic cost of the facilities (ElementEnergy, 2010; Knoope et al., 2013): pipeline diameter, pressure drop, erosional velocity, capacity of the booster stations, etc. As for the injection and storage processes, the density variation due to the presence of impurities affects parameters such as injection flow, solubility parameter, storage capacity and rising velocity of the plume (Blanco et al., 2012).

The variety of emission sources, capture and conditioning processes as well as the storage reservoirs, can cause the composition of the stored fluid to be quite varied. In particular, CH₄ is a likely impurity in the CO₂ capturing process from natural gas sweetening, and is present in significant quantities in some reservoirs (reservoirs exhausted of coal and natural gas); CO is a likely impurity in processes from heavy oil production and upgrading, and both are expected impurities from power plants using pre-combustion capture. Additionally, there is a significant legislative gap regarding the range of compositions allowed in anthropogenic CO₂. As a consequence, the experimental study and thermodynamic modelling of these systems have become important: we must understand how the composition of these systems affect their behaviour and make technology profitable while ensuring maximum safety.

Knoope et al. 2013 recognize a significant knowledge gap in the calculation of the economic costs of the process since none of the models used take into account the impact of impurities on the various design parameters. Moreover, the shortage of experimental data, especially of volumetric properties under conditions relevant to CCS technology, means that there is not a preferred thermodynamic model to predict

the behaviour of the fluid to be transported and stored (Li et al., 2011a; Li et al., 2011b; Sánchez-Vicente et al., 2013). The most common models are based on the use of equations of state of different nature: cubic (Peng-Robinson, Patel-Teja...), those derived from statistical mechanics (SAFT versions, CPA...) or multiparameter approaches (GERG). However, all of them should be validated with experimental data of mixtures, under conditions at which transportation and storage of anthropogenic CO₂ take place: compositions rich in carbon dioxide, $x_{\text{CO}_2} > 0.85$, and pressure and temperature values corresponding to the critical region.

It is also important to know the nature of the interactions between CO₂ molecules and those of compounds which may appear in the capture and storage processes, since they may alter the selectivity in the capturing process or induce additional phenomena during storage. This study can be performed from ab-initio calculations (Liu and Wilcox, 2013), molecular dynamics (Lachet et al., 2012) and statistical mechanics (Blanco et al., 2009).

In our current work we have studied the volumetric behaviour of mixtures of carbon dioxide with small amounts of methane or carbon monoxide, at compositions, temperatures and pressures of interest in CCS technology (ElementEnergy, 2010; Li et al., 2011; ENCAP Project, 2008): $x_{\text{CO}_2} \geq 0.97$, $T = 304.21$ and 308.15 K, and $P = 0.1$ - 20 MPa. The CO₂+CH₄ and CO₂+CO systems have been modelled using three different Equations of State, EoS: PR (Peng and Robinson, 1976), EoS widely used in engineering for their acceptable results despite the simplicity in implementación; PC-SAFT (Gross and Sadowskii, 2001 and 2002), EoS nowadays used in various applications including the study of the supercritical fluids; and GERG-2008 (Kunz and Wagner, 2012), EoS

developed for mixtures containing components of natural gas. The three EoS have been validated for these systems under the aforesaid conditions. We have performed a theoretical study of the interactions that occur between the molecules involved in these mixtures near the critical point of the solvent, showing the affinity of the solvent molecules, CO₂, for the solute, CH₄ or CO. The study has been conducted using the Krichevskii function concept (Levelt Sengers, 1994 and Japas et al., 1998) and the Kirkwood-Buff Theory (Kirkwood and Buff, 1951). Finally, we have calculated the effect of CH₄ and CO as impurities on various operating transport parameters in CCS technology, by comparing the physicochemical properties of the mixtures with those of pure CO₂. This aspect has not been well studied in the literature. To this end, we have used equations which have been reviewed and widely accepted for modelling by the industrial and engineering community (ElementEnergy, 2010).

2. Materials and methods

2.1. Chemicals

Carbon dioxide (mole fraction > 99.998 %), methane (mole fraction > 99.995 %) and carbon monoxide (mole fraction > 99.997 %) were obtained from Air Liquide and used without further purification.

2.2. Apparatus

Density measurements were carried out using an experimental setup described in a previous work (Velasco et al., 2011). The apparatus was designed and built by ARMINES and the Laboratoire de Thermodynamique des Equilibres entre Phases de l'École Nationale Supérieure des Mines de Paris (France) for fast, reliable and accurate generation of $P\rho T$ data for pure compounds and mixtures over the whole state surface of a fluid encompassing the liquid and vapour compressed phases, and the saturation

curve in the (253 to 423) K \pm 0.006 K temperature range, up 70 MPa pressure with a precision of 0.025% FS.

The main component of the system is a vibrating tube densimeter Anton Paar DMA HPM which includes the measuring cell and an interface module. Increases or decreases in pressure inside the cell are obtained through mass transfers with respect to the measurement circuit. Connecting the unit to a mPDS 2000V3 evaluation unit allows quasi-continuous data acquisition. A schematic diagram is shown in Fig. S1 (Supporting Information).

2.3. *Experimental procedure*

A variable-volume cell is used for loading mixtures into the measurement circuit. Successive introduction of compounds allow the preparation of mixtures of accurately determined composition due to successive weighing of the cell on a mass comparator from Sartorius, model CCE 2004, with maximum masses of 2500 g and typical repeatability better than 0.0001 g. The components are introduced in order of increasing volatility and the mixture formed is homogenized through efficient stirring and kept at pressures higher than its bubble pressure.

The fluid is transmitted from the loading cell to the measurement circuit through a manual pump, which makes it possible to achieve pressures up to 70 MPa inside the measurement circuit (in this work, the maximum operating pressure was 20 MPa). When the fluid to be studied exhibits phase transition within the operating range of temperature and pressure, the density measurement is performed in two stages: (i) ascending from atmospheric pressure to the pressure corresponding to phase transition; and (ii) descending from the maximum operating pressure down to

the pressure of the phase transition. However, when the fluid exhibits no phase transition, as is the case in this work, the measurement is only carried out with descending pressure.

Since we must ensure a quasi-static equilibrium, the pressure changes have been kept sufficiently low; they are usually below $0.005 \text{ MPa}\cdot\text{s}^{-1}$. Thus, each isotherm in the range of 0.1 to 20 MPa consists of about 4,000 density-pressure points, which are evenly reduced to about 1,000 points for easier handling in subsequent calculations. This large number of points makes quasi-continuous isotherms available along subcritical, critical and supercritical regions, and allows the accurate determination of density derivative properties.

2.4. *Calibration and uncertainty*

The general principle of the vibrating tube densimeter is based on the application of the relation between the vibrating period of a one-dimensional resonator and its vibrating mass. This system has a transversal stiffness $K = K(T, P)$ and is vibrating with a period (τ) in an undamped harmonic way under the effect of a mechanical excitation. Considering the vibration period, τ , as a pseudo state variable, the $P\tau T$ variables can describe the $P\rho T$ state surface as long as a calibration may provide a direct relation between τ and ρ (Appendix A, Eq. A1 and A2). In this work, Forced Path Mechanical Calibration Model, FPMC (Bouchot and Richon, 2001), has been used. This model includes realistic mechanical considerations and forces representing the stress and strain behaviour of the tube material.

In order to evaluate the precision in density results, $\rho = \rho(\rho_{ref}, \tau, P, T)$, uncertainty propagation law has been used (Appendix A, Eq. A3). The reference fluid to calibrate was pure CO₂ and the estimated uncertainty in P and T were $u(P) = \pm 0.008$ MPa and $u(T) = \pm 0.006$ K (Velasco et al., 2011). From those and $u(\rho_{ref}) = 0.03\%$ (Span and Wagner, 1996) and $u(\tau) = \pm 2 \times 10^{-5}$ ms (Bouchot and Richon 2001), the expanded ($k=2$) uncertainty in the density has been calculated for our mixtures: $U(\rho) = 0.4 - 0.7$ kg.m⁻³. On the other hand, the repeatability of the density measurements for mixtures, expressed as relative mean standard deviation (Appendix A, Eq. A4-A6), is $\bar{S}_\rho^r = 0.13\%$ (Velasco et al., 2011).

3. Results

3.1. Experimental density

P - ρ - T - x_{CO_2} measurements for {CO₂ + CH₄} ($x_{\text{CO}_2} = 0.9719, 0.9809, 0.9902, 0.9932, 0.9961$) at $T = 304.21$ K (critical temperature of pure CO₂, Gil et al., 2008) and {CO₂ + CO} ($x_{\text{CO}_2} = 0.9700, 0.9810, 0.9902, 0.9930, 0.9960$) at $T = 304.21$ and 308.15 K were carried out in the pressure range from 0.1 to 20 MPa.

Experimental results are shown in Fig. 1 for the CO₂ + CH₄ system and Fig. 2 ($T = 304.21$ K) and 3 ($T = 308.15$ K) for CO₂ + CO mixtures. Full numerical data are included in Tables S1-S3 in the Supporting Information. As shown in Fig. 1-3, at the studied temperatures the densities of all mixtures change continuously with pressure, and an inflection point appears in the isotherms; that is, the systems are at a supercritical temperature for any composition, a fact which is consistent with literature data on critical locus of these systems (Donnelly and Katz, 1954; Bian et al., 1993; Ke et al., 2001): the critical temperatures of all mixtures under study range from 302.6 K to

303.9 K. At the same temperature (304.21 K) the influence of the presence of CO on the density of the mixtures is higher than those of CH₄. For a given system (CO₂ + CO or CO₂ + CH₄), the influence of the presence of solute on the density of the mixtures is higher at 304.21 K (T_c of pure CO₂) than at 308.15 K (for CO₂ + CH₄ at 308.15, see Blanco et al. 2012).

Table 1 lists literature references for the volumetric properties of the two systems as well as the T - P - x_{CO_2} ranges of each study. As can be seen, the system CO₂ + CH₄ has been widely studied, however there are only eight studies in which the values of temperature, pressure and composition are of interest in CCS technology, and solely the data published by Zhang et al. (2002) and Blanco et al. (2012) analysed the region of infinite dilution, IDS, the region that has been studied in our current work. Our experimental data are consistent with those but not directly comparable since temperature do not match. We have carried out a comparison between the experimental density data from Blanco et al. (2012), used further in this study, for the mixture of composition $x_{\text{CO}_2} = 0.9961$ and those published by Zhang et al. (2002) for the mixture $x_{\text{CO}_2} = 0.997$, both at $T = 308.15$ K, obtaining a mean relative deviation (Appendix A, Eq. A7): $MRD_\rho = 2.2 \%$

For the CO₂ + CO system the extent of literature data is rather small. Mallu et al. (1987) and Cipollina et al. (2007) have studied its volumetric behaviour, and our experimental data are consistent with those but not directly comparable, since the compositions do not match.

3.2. Isothermal compressibility

From the P - ρ - T - x_{CO_2} experimental values of the mixtures studied, we have evaluated the effect of pressure on density at the critical temperature of pure solvent, $T = 304.21$ K, by means of the isothermal compressibility, κ_T , defined as:

$$\kappa_T = \left(\frac{1}{\rho}\right) \left(\frac{\partial \rho}{\partial P}\right)_T \quad (1)$$

Fig. 4 and 5 show the κ_T - x_{CO_2} - P representations for $\text{CO}_2 + \text{CH}_4$ and $\text{CO}_2 + \text{CO}$ mixtures, respectively. It can be seen that the dependence of the isothermal compressibility on pressure and composition is similar for both systems: (i) κ_T varies with pressure, going through a maximum; (ii) the maximum value of κ_T increases as the composition of CO_2 goes up, since the critical temperature of the increasingly CO_2 rich mixture approaches the critical temperature of CO_2 ; and (iii) the pressure at which the maximum in κ_T occurs decreases as the composition of CO_2 rises, since the critical pressures, P_c , of both systems decrease when x_{CO_2} increases (Donnelly and Katz, 1954; Bian et al., 1993; Ke et al., 2001). Moreover, when comparing the mixture compressibility for the two systems with the same concentration, we observe if $x_{\text{CO}_2} < 0.99$, the maximum value for the isothermal compressibility of the $\text{CO}_2 + \text{CH}_4$ system is higher than that for $\text{CO}_2 + \text{CO}$ and when $x_{\text{CO}_2} > 0.99$, this trend is reversed.

3.3. Excess molar volume and solute partial molar volume

From experimental data obtained in this work and literature experimental values for the $\text{CO}_2 + \text{CH}_4$ system at 308.15 K (Blanco et al., 2012), we have calculated the excess molar volume of the mixture, V_m^E , using the following expression:

$$V_m^E = V_m - V_1 - V_2 = \frac{x_1 M_1 + x_2 M_2}{\rho_m} - \frac{x_1 M_1}{\rho_1} - \frac{x_2 M_2}{\rho_2} \quad (2)$$

where the subscripts 1, 2 and m refer to solvent (CO_2), solute (CH_4 or CO), and mixture, respectively; M_i is the molar mass of each component i in the mixture, and V_i , V_m , ρ_i and ρ_m are the molar volume and the density for the pure compounds and the mixture at temperature T and pressure P .

Due to the small values of the densities of these mixtures at low pressures, we have calculated the expanded ($k = 2$) uncertainties in the excess molar volumes in the 5 - 20 MPa range. The rules of propagation of errors (Appendix A, Eq. A3) have been used, obtaining the values $U(V_m^E) = 0.1 - 1 \text{ cm}^3 \cdot \text{mol}^{-1}$.

Fig. 6 shows the trends in the excess molar volumes, V_m^E , with pressure and composition for two mixtures, $x_{\text{CO}_2} \cong 0.971$ and $x_{\text{CO}_2} \cong 0.993$, of both systems at the two operating temperatures. They are supercritical mixtures and we observe a peak in the excess molar volume: $P \cong 7.41 \text{ MPa}$ at $T = 304.21 \text{ K}$ and $P \cong 8.15 \text{ MPa}$ at $T = 308.15 \text{ K}$. The value of the maximum for V_m^E decreases with increasing temperature and molar fraction of CO_2 . Finally, the maxima in V_m^E for $\text{CO}_2 + \text{CO}$ mixtures are higher than for mixtures $\text{CO}_2 + \text{CH}_4$, which means that the inclusion of a molecule of CO in pure CO_2 disturbs the system to a further extent than when introducing a molecule of CH_4 . This may be due to either the dipolar moments ($\mu_{\text{CO}_2} = \mu_{\text{CH}_4} = 0$; $\mu_{\text{CO}} = 0.122 \text{ D}$), the sizes of the components of each system (the size difference between the molecules of CO_2 and CH_4 is smaller than that between CO_2 and CO), or both.

From the density data, the partial molar volume of the solute, \bar{V}_2 , has been calculated for the five studied compositions of each system at temperatures of 304.21 and 308.15 K and selected pressures of 7.383 MPa (critical pressure of pure CO_2) and 8.000 MPa (supercritical pressure). To this end we have used the following expression:

$$\bar{V}_2 = V_m + (1 - x_2) \left(\frac{\partial V_m}{\partial x_2} \right)_{P,T} \quad (3)$$

where the subscripts 2 and m refer to solute (CH₄ or CO) and mixture respectively, and V_m is the molar volume of the mixture at temperature T and pressure P . $(\partial V_m / \partial x_2)_{P,T}$ values have been calculated from polynomial fittings of V_m vs. x_2 , being V_m the first term in the right side of Eq. 2.

The expanded ($k=2$) uncertainties in \bar{V}_2 have been calculated using the rules of propagation of errors (Appendix A, Eq. A3). The values are $U(\bar{V}_2) = 3 - 85 \text{ cm}^3 \cdot \text{mol}^{-1}$.

Fig. 7 shows trends in the partial molar volumes of the solute, \bar{V}_2 , with solute concentration at the above indicated pressures and temperatures. A similar behaviour is observed for the two systems under study: at $P = P_c(\text{CO}_2) = 7.383 \text{ MPa}$, \bar{V}_2 decreases with increasing solute concentration at both working temperatures, with a much smaller slope at 308.15 K. By contrast, at the supercritical pressure, $P = 8.000 \text{ MPa}$, \bar{V}_2 increases with increasing solute concentration at $T = 304.21 \text{ K}$, and decreases at $T = 308.15 \text{ K}$.

We have compared (Fig. S2, Supporting Information) the values of \bar{V}_2 calculated in this work for the {0.9961CO₂ + 0.0039CH₄} mixture with those calculated by Zhang et al. (2002) for the {0.997CO₂ + 0.003CH₄} mixture at 308.15 K, observing good agreement, especially in the dense region. The mean relative deviation, calculated with Eq. (1), at the point corresponding to the maximum value of \bar{V}_2 is $MRD_{\bar{V}_2} < 6\%$.

The strong dependence of V_m^E on pressure and composition (Fig. 6) demonstrates the non-ideality of the studied systems. However, the greater values of V_m^E and

$(\partial \bar{V}_2 / \partial x_2)$ exhibited by the $\text{CO}_2 + \text{CO}$ system suggest that this system deviates from ideality further than $\text{CO}_2 + \text{CH}_4$.

4. Modelling

Due to the variety of compositions that the transported and later stored fluid can present, as well as the pressure and temperature operational ranges within CCS technology, it is interesting to develop effective working tools which will allow to correctly predict the phase and volumetric behaviour of the fluid. To do this, our experimental $P - \rho - T$ results have been compared, in terms of relative mean deviation, MRD_x (Appendix A, Eq. A7), with those calculated using three different types of equations of state, validating them for these experimental conditions.

(i) Peng-Robinson EOS (Peng and Robinson, 1976). The cubic equations are the simplest EoS which predict the existence of a critical point and quantitative representation of VLE. Their simple structure, which requires little input information, make them popular for engineering applications.

The parameters used for the pure components, as well as the binary interaction parameter, k_{ij} , included in the mixing rule of a van der Waals fluid, are shown in Table 2. A comparison between our experimental data and those calculated with the PR EoS are shown in Table 3. Despite its simplicity, the agreement with experimental data is good at pressures below the critical pressure, $MRD_\rho = 1.8 \%$ for both systems, and acceptable at higher pressures: $MRD_\rho(\text{CO}_2 + \text{CH}_4) = 4.4 \%$ and $MRD_\rho(\text{CO}_2 + \text{CO}) = 4.1 \%$.

(ii) PC-SAFT EoS (Gross and Sadowski, 2001, 2002). In this model, based on Wertheim's first order thermodynamic perturbation theory, the reference fluid is the hard-chain fluid. Attractive intermolecular forces are further separated into different contributions, so that the Helmholtz energy, a , is written as the sum of the ideal-gas contribution, a^{id} , a hard-chain term, a^{hc} , a contribution for the dispersive attraction, a^{dis} , and several terms for associating, dipolar and quadrupolar interactions. In this work, we have not taken into account the polar and association contributions, therefore the terms contributing to the Helmholtz energy are as follows:

$$a = a^{id} + a^{hc} + a^{dis} \quad (4)$$

For the non-polar pure compounds, three parameters are needed: the segment number, m , the segment diameter, σ , and the segment energy parameter, ε . These parameters provide an accurate representation for both volumetric and VLE properties if they are obtained from vapor pressures and liquid densities; however, they always overestimate the critical properties. In order to describe the critical region, different authors (Cismondi et al., 2005; Blanco et al., 2009; Gil et al., 2010, 2012) perform a rescaling of pure-compound parameters using their T_c and P_c . In this work we have applied PC-SAFT EoS to our systems with both options, using pure compounds parameters (m , σ , ε) original and rescaled. Moreover, in both cases, we have adjusted the experimental density values of pure CO₂ and CO using volume shift, Δv_c .

The parameters used for the pure components, the mixing parameters and a comparison between our experimental data and calculated values are found in Tables 2 and 3 respectively. When the original parameters for the pure compounds are used (Gross and Sadowski, 2001, 2002), the model predicts in the vicinity of the critical pressure, P_c , an erroneous subcritical state for many of our mixtures when in reality

those are at supercritical conditions. Mean relative deviations in this region ($P = 7 - 9$ MPa) are $MRD_{\rho}(\text{CO}_2 + \text{CH}_4) = 12.8 \%$ and $MRD_{\rho}(\text{CO}_2 + \text{CO}) = 8.1 \%$. However, the agreement outside the critical region is much better: $MRD_{\rho}(\text{CO}_2 + \text{CH}_4) = 0.5 \%$ and $MRD_{\rho}(\text{CO}_2 + \text{CO}) = 0.8 \%$. On the other hand, if the parameters used are rescaled using the critical points of the pure compounds, the model predicts supercritical state for all mixtures and represents the critical region more accurately, with $MRD_{\rho}(\text{CO}_2 + \text{CH}_4) = 5.7 \%$ and $MRD_{\rho}(\text{CO}_2 + \text{CO}) = 5.6 \%$, although the deviation for the remaining pressures is higher: $MRD_{\rho}(\text{CO}_2 + \text{CH}_4) = 2.5 \%$ and $MRD_{\rho}(\text{CO}_2 + \text{CO}) = 2.4 \%$.

(iii) GERG EoS (Lemmon et al., 2010). International reference equation of state for natural gases based on a multi-fluid approximation. This approximation divides the Helmholtz energy formula into three terms: one term to account for ideal gas behaviour, a second term describing the contributions of pure substances and a third term for the departure function. This equation covers subcritical, critical and supercritical regions as well as liquid-vapor phase boundaries but its accuracy decreases when the GERG database contains few experimental data of the studied system. It should also be noted that the uncertainty increases in both density and VLE calculations of CO_2 -rich mixtures (Li et al., 2011).

As can be seen from Table 3, a comparison between our experimental data and those calculated with the GERG EoS is very good for both systems; the deviation for $\text{CO}_2 + \text{CH}_4$ is smaller, since the EoS developed for this system used a larger number of experimental data, covering a wider range of pressures. However, for $\text{CO}_2 + \text{CO}$, the EoS GERG database only contains VLE data in the pressure range from 0.1 to 6 MPa.

The deviations obtained are: $MRD_{\rho}(\text{CO}_2 + \text{CH}_4) = 0.4 \%$ and $MRD_{\rho}(\text{CO}_2 + \text{CO}) = 1.0 \%$.

GERG EOS is the equation that best represents our experimental results, although its extension to mixtures with compounds not included in their database is complex. By contrast, PC-SAFT EoS offers slightly higher deviations than GERG, but its use can be extended easily to multicomponent mixtures. Finally, PR EoS may be adequate, depending on the working pressure and the accuracy required.

Fig. 8a and 8b depict the relative deviations between the experimental densities and the values calculated using PR, PC-SAFT and GERG EoS for selected mixtures studied in this work (different solute, composition and temperature). Deviations are similar at both temperatures for pressure values far from the critical, while in the near-critical zone the nearer is the temperature to the critical value the higher the deviations.

5. Discussion

5.1. Study of the interaction CO_2 - impurity

The efficiency and selectivity of the capture processes are influenced by the type of interactions between the molecules present, that is, by their affinity. Moreover, once the fluid is stored, CO_2 molecules can interact with other molecules present in the reservoir, consequently modifying the behaviour of the plume (Blanco et al., 2012). In this section we determine the nature of the interactions between solvent molecules, CO_2 , and those of the solute, CH_4 or CO , through a volumetric study in the critical region of infinitely dilute solutions, IDS, for systems $\{\text{CO}_2 (1) + \text{CH}_4$ or CO

(2)}. We use the Krichevskii function concept (Levelt Sengers, 1994 and Japas et al., 1998) and the Kirkwood-Buff Theory (Kirkwood and Buff, 1951).

5.1.1 Krichevskii function.

The Krichevskii function, J , represents the pressure change that occurs in a system when a molecule of solvent is replaced by one of the solute at constant T and V in IDS. When the conditions of T and V correspond to critical conditions for the pure solvent, the Krichevskii function, J , becomes the Krichevskii parameter, A_{Kr} :

$$J = (\partial P / \partial x_2)_{T,V}^{\infty} \quad (5)$$

$$A_{Kr} = (\partial P / \partial x_2)_{T_c, V_c}^{c,\infty} \quad (6)$$

According to Equations (5) and (6), given a number of volumetric data at infinite dilution, the values for the Krichevskii function (including the parameter A_{Kr}) can be calculated from the slopes of the isotherms-isochores $P - x_2$ when $x_2 \rightarrow 0$.

Fig. 9a and 9b show some experimental results on the $P - x_{CH_4}$ and $P - x_{CO}$ planes at $T = 304.21$ K for mixtures studied along various isochores, including the critical. The slopes of the $P - x_2$ graphs increase in both systems with increasing density, being greater when CO is the solute. The slopes along the critical isothermal-isochoric, the Krichevskii parameter, for our systems are shown in Table 4. In the literature we have found some values for the $A_{Kr}(CO_2 + CH_4)$ parameter; the mean relative deviations between our results and the literature are: $MRD_{A_{Kr}} = 1.6$ % (Furuja and Teja, 2000) and $MRD_{A_{Kr}} = 8.0$ % (Abdulagatov et al., 2007).

The values of the $P - x_2$ slopes on the rest of isochores allow us to complete the study of the behaviour of IDS when expanding it to other states different to the critical point. Fig. 10 shows the evolution of the Krichevskii function, J , with the density of the pure solvent, ρ_{CO_2} , at $T = 304.21$ and 308.15 K for the two systems under study. As can be seen, J is positive over the entire range of densities and its values are slightly higher and less sensitive to temperature for $\text{CO}_2 + \text{CO}$ than for the $\text{CO}_2 + \text{CH}_4$ system.

The partial molar volume of solute at infinite dilution, \bar{V}_2^∞ , can be expressed in terms of the Krichevskii function, J (Blanco et al., 2009):

$$\rho_1^0 \bar{V}_2^\infty = [1 + \kappa_T^0 J] \quad (7)$$

Where the superscripts 0 and ∞ denote pure component and infinite dilution, respectively, and ρ_1^0 and κ_T^0 are the density and the isothermal compressibility of the solvent.

In the vicinity of the critical point of the solvent, $J \rightarrow A_{Kr}$ and the compressibility of the pure solvent, κ_T^0 , is a divergent function ($\kappa_T^0 \rightarrow +\infty$); therefore, under these conditions, the partial molar volume of the solute at infinite dilution will also be divergent $\bar{V}_2^\infty \rightarrow \pm\infty$, and the sign of the Krichevskii parameter will define the sign of such divergence. For the two mixtures studied in this work, the parameter $A_{Kr} > 0$, thus at the critical point of the solvent, $\bar{V}_2^\infty \rightarrow +\infty$. A representation of \bar{V}_2^∞ vs ρ_{CO_2} can be seen in Fig. S3 (Supporting Information). Table 4 shows the maximum values of \bar{V}_2^∞ exhibited by our systems at a temperature of 308.15 K; these peaks appear in the vicinity of the critical pressure ($\cong 8$ MPa) and the value is higher for the $\text{CO}_2 + \text{CO}$ mixture, which suggests that the substitution of a molecule of CO_2 for one of CO

results in a bigger change in the volume of the system than if the replacing molecule were CH₄.

The only value found in the literature for the partial molar volume at infinite dilution of the systems studied has been published by Abdulagatov et al. (2007) for the CO₂ + CH₄ system. These authors find a negative sign for the divergence of \bar{V}_2^∞ , which is not consistent with the positive sign of their own value of A_{Kr} .

5.1.2. Structural Properties.

The study of a fluid structure can be conducted through the so-called Inversion of the Kirkwood-Buff Theory (Kirkwood and Buff, 1951), developed by Ben-Naim in 1977. In it, measurements of thermodynamic properties are used to calculate Kirkwood-Buff integrals, $G_{ij} = \int_0^\infty [g_{ij}(r) - 1]4\pi r^2 dr$, where $g_{ij}(r)$ is the pair correlation function or radial distribution function for species i and j , and represents the probability of finding the particle i at a distance r of the particle j . Strictly speaking, the G_{ij} integrals are not molecular properties, however, they provide information about the species' local packing.

For a binary mixture at infinite dilution conditions, $x_2 \rightarrow 0$, the Kirkwood-Buff equations are simplified (Lee and Cochran, 1994; Chialvo and Cummings, 1995) to:

$$\rho_1^0 \bar{V}_2^\infty = 1 + \rho_1^0 (G_{11}^0 - G_{12}^\infty) \quad (8)$$

$$\rho_1^0 RT \kappa_T^0 = 1 + \rho_1^0 G_{11}^0 \quad (9)$$

Considering Equations 7 and 8:

$$J = \frac{\rho_1^0 (G_{11}^0 - G_{12}^\infty)}{\kappa_T^0} \quad (10)$$

Alternatively, the Kirkwood-Buff equations and the expression for the Krichevskii function can be written in terms of the direct correlation function integral (DCFI), $C_{ij} = \int c_{ij} dr$ where c_{ij} represents the direct correlation due solely to the interaction forces exerted between two particles in a system of $N-2$ particles.

$$\rho_1^0 \bar{V}_2^\infty = \rho_1^0 RT \kappa_T^0 (1 - C_{12}^\infty) \quad (11)$$

$$(\kappa_T^0)^{-1} = \rho_1^0 RT (1 - C_{11}^0) \quad (12)$$

$$J = \rho_1^0 RT (C_{11}^0 - C_{12}^\infty) \quad (13)$$

As can be seen in Equations 10 and 13, J represents the difference between solvent - solvent (1-1) and solvent - solute (1-2) interactions, making it possible to evaluate the ideality of the mixture: a value close to zero indicates that these interactions are very similar. The equations above show that, in IDS, the rearrangement of the solvent around the solute, in relation to the structure of the pure solvent, is not determined by the strength of the interaction between the molecules of solvent and solute, but defined by the intermolecular asymmetry. The values of the direct correlation function integrals, C_{ij} , for $\text{CO}_2 + \text{CH}_4$ are higher than for $\text{CO}_2 + \text{CO}$ (Table 4 shows one of them, $(C_{12})_{\rho_c}$). However, the greater asymmetry of the second system causes a more extensive change in the structure of the solvent, as evidenced by higher values of $(C_{11} - C_{12})$; a graphical representation is shown in Fig. S4 (Supporting Information).

N_{exc}^∞ is defined as the excess number of solvent molecules around a solute molecule in the IDS, in relation to the number of solvent molecules around another solvent molecule. This parameter is related to the radial distribution functions for the

interactions solvent - solute (1 - 2) and solvent - solvent (1 - 1) and consequently with the Krichevskii function:

$$N_{exc}^{\infty} = (N_{12} - N_{11}) = 4\pi\rho_1^0 \int_0^{R_{shell}} [g_{12}(r) - g_{11}(r)]r^2 dr = -\kappa_T^0 \left(\frac{\partial P}{\partial x_2} \right)_{T,V}^{\infty} \quad (14)$$

Where N_{12} represents the number of solvent molecules around a solute molecule and N_{11} indicates that each solvent molecule is surrounded by a box of N_{11} solvent molecules. If we consider the sign obtained for the Krichevskii function in our current work, we realise that the exchange of one solvent molecule for another of solute, at constant volume and temperature, causes a decrease in the local density of CO₂ molecules around a molecule of solute in the IDS compared to that of pure CO₂, and the effect is greater for CO than for CH₄. A plot of N_{exc}^{∞} vs ρ_{CO_2} is shown in Fig S5 (Supporting Information), and Table 4 lists the minimum values found for the excess coordination number, N_{exc}^{∞} , of our systems at 308.15 K.

Moreover, the affinity of solvent molecules for a molecule of solute, or cluster size, N_1^{exc} , may be calculated from the properties of the pure solvent and from the so-called dimensionless Krichevskii parameter $A_{Kr}^* = A_{Kr}/\rho_1^0 RT$,

$$N_1^{exc} = 4\pi\rho_1^0 \int_0^{R_{shell}} [g_{12}(r) - 1]r^2 dr = \rho_1^0 RT \kappa_T^0 (1 - A_{Kr}^*) \quad (15)$$

Fig. 11 shows the evolution of N_1^{exc} with the density of pure solvent for our systems: it becomes a divergent function at the solvent critical point, $N_1^{exc} \rightarrow +\infty$, and at 308.15 K, the maximum for the CO₂ + CO system is smaller in magnitude than that for CO₂ + CH₄ (Table 4).

Finally, according to Wheeler's Decorated Lattice Model (Wheeler, 1972), the behaviour of a near-critical system can be classified in terms of the solvent-solute interaction energy, ε_{12} , when adding a solute molecule to the solvent under isobaric and isothermal conditions: (i) attractive behaviour ($\varepsilon_{12} \ll 0$) which results in a volume contraction and an enrichment of solvent around the solute ($\bar{V}_2^\infty \rightarrow -\infty, N_1^{exc} \rightarrow +\infty$); (ii) weakly attractive behaviour ($\varepsilon_{12} < 0$), causing a volume expansion together with an enrichment in solvent ($\bar{V}_2^\infty \rightarrow +\infty, N_1^{exc} \rightarrow +\infty$); and (iii) repulsive behaviour ($\varepsilon_{12} > 0$) that leads to a volumetric expansion and a decrease in solvent around the solute ($\bar{V}_2^\infty \rightarrow +\infty, N_1^{exc} \rightarrow -\infty$). Debenedetti and Mohamed in 1989 and Lee and Cochran in 1994 established that for IDS in the vicinity of the critical point, mixtures can be classified within the previous regimes depending on the sign of the Krichevskii parameter, A_{Kr} , the value of the dimensionless parameter, A_{Kr}^* , and the divergence signs for different properties: $\bar{V}_2^\infty, N_{exc}^\infty$, and N_1^{exc} .

For the mixtures included in this study:

$$A_{Kr} > 0; \quad \bar{V}_2^\infty \rightarrow +\infty; \quad N_{exc}^\infty \rightarrow -\infty; \quad 1 > A_{Kr}^* > 0; \quad N_1^{exc} \rightarrow +\infty$$

Therefore we can conclude that both systems, near the solvent critical point, behave as weakly attractive mixtures. There are studies in the literature on the nature of the CO₂ + CH₄ system based on Molecular Dynamics Simulation (Baglin et al., 2000; Skarmoutsos and Samios, 2006; Parris, 2010). Skarmoutsos and Samios determined that this system shows repulsive behaviour with a value of the excess coordination number slightly negative, $N_{exc}^\infty = -0.261$. However, their calculations were performed under conditions of temperature and pressure away from the critical point: $T = 323.15$ K and $P = 9.94$ MPa.

5.2. Effect of impurities in the process design

Given that the technology for natural gas (NG) transport is well developed and that there are vast pipeline networks dedicated to this use, it would seem a possibility to use existing gas pipeline for CO₂ transport. However, the large differences between the behaviour of CH₄ (main component in NG) and that of CO₂ (main compound in CCS), in practice limit this use to transport in gas phase (ElementEnergy 2010, Serpa et al. 2011). Therefore, it may become necessary to design a new pipeline network to transport CO₂ in dense or supercritical phase. Furthermore, the presence of impurities in the anthropogenic CO₂ stream, even in small proportions, can significantly modify the properties of the fluid to be transported, primarily the phase equilibrium, density and viscosity, which strongly affects pipeline hydraulics and many other aspects of pipeline design and operation (Seevam et al., 2008). In order to evaluate these effects the usual parameters related to transport have been used: mass flow, m , erosional velocity, v_E , pipeline inner diameter, D , Reynolds number, Re , Darcy-Weisbach friction factor, f , pressure drop per unit length $\Delta P/L$, and capacity of the booster stations, W (Table 5). To calculate them, models based on the law of Bernoulli for incompressible flow, applied to full and turbulent flow in circular shaped pipelines have been used. These models, relatively simple but pragmatic, have been reviewed and accepted by the industrial and engineering community (Vandeginste and Piessens 2008, ElementEnergy 2010). To establish a comparison between the behaviour of the pure CO₂ stream and the stream containing impurities, normalized parameters have been defined, X/X_0 , where X are the above mentioned parameters for the mixtures and X_0 for pure CO₂. Table S4 (Supporting Information) shows the equations for normalized parameters, as well as certain conditions that have been kept constant for both

streams in their calculations. In this manner, the deviations from unity of the normalized parameters are due to the different compositions and, therefore, different properties of pure and anthropogenic CO₂ streams.

Conditions of composition ($x_{\text{CO}_2} \cong 0.97$), pressure ($P = 8.6\text{-}20$ MPa) and temperature ($T = 304.21$ and 308.15 K) used for the calculation are within customary in CCS technology (ElementEnergy 2010, Li et al., 2011). The experimental values of the densities used in the calculation have been taken from this work, from Blanco et al. 2012 and from Velasco et al. 2011. The viscosities have been obtained from REFPROP 9.0 (Lemmon et al. 2010) by using the extended corresponding states (ECS) model developed by Klein et al. (1997).

To obtain the friction factors, f , and the pressure drops per metre, $\Delta P/L$, standard values for pipeline inner diameter, $D = 0.508$ m, and mass flow, $m = 317$ kg/s (Serpa et al. 2011), and roughness height of commercial steel, $e = 4.6 \times 10^{-5}$ m (Vandeginste and Piessens 2008), have been used.

The results are shown in Table S5 (Supporting Information) and in Fig. 11, 12, and S6-S9 (Supporting Information). As can be seen, the differences with respect to the behaviour of pure CO₂ are greater for CO₂+CO than for CO₂+CH₄ mixtures, in accordance with the conclusions drawn in section 5.1 (the CO molecule provokes greater structural disruption than CH₄ in their respective mixtures with CO₂). For both systems, the differences increase with increasing T and decreasing P . They became significant at pressures ranged from 8.6 to 10 MPa, but they are smaller than 10% above 15 MPa.

For a transport velocity and a pipeline inner diameter, the mass flow, m , is lower for mixtures than for pure CO₂ ($m/m_0 = 0.96 - 0.66$, Fig. S8, Supporting Information), due to the lower density of the mixtures. Normalized Darcy-Weisbach friction factors, f/f_0 , are as well lower than 1 (0.995 - 0.999, Fig. S9, for the utilized pipeline inner diameter, mass flow and roughness height). The rest of the normalized parameters are greater than 1, which means that the corresponding values for the mixtures parameters are higher than those for pure CO₂. The higher deviations appear in the mixture CO₂+CO at 308.15 K and 8.6 MPa, with $Re/Re_0 = 1.75$ and $(\Delta P/L)/(\Delta P_0/L) = 1.50$. Pressure drop per metre is higher for mixtures than for pure CO₂ in all the studied cases, a fact which might require an increase in the number of boosters along the network, especially if transport is carried out at low pressures.

6. Conclusions

Density measurements of the {CO₂ (1) + CH₄ (2)} and {CO₂ (1) + CO (2)} systems were carried out under conditions of composition, pressure and temperature of interest in CCS technology: $x_{\text{CO}_2} \geq 0.97$, $P = 0.1$ to 20 MPa, and $T = T_c(\text{CO}_2) = 304.21$ K for both systems and at $T = 308.15$ K for the CO₂ + CO system. All P - ρ - T - x_{CO_2} data have been obtained using a vibrating-tube densimeter, and the mean relative standard deviation of density, \bar{S}_ρ^r , was estimated to be better than 0.13%. Other properties related to experimental data such as isothermal compressibility, κ_T , excess molar volume, V_m^E , and solute partial molar volume, \bar{V}_2^E , in the critical region ($T = 304.21$ and 308.15 K and $P = 5 - 10$ MPa) have been calculated as a function of pressure and composition.

The volumetric behaviour has been compared to literature data and it has been modelled with three Equations of State. The deviations obtained have been: Peng-Robinson, $MRD_\rho \leq 3.5 \%$; rescaled PC-SAFT, $MRD_\rho \leq 2.8 \%$; and GERG, $MRD_\rho \leq 1.0 \%$. Thus the three EoS have been validated, for these binary systems, under CCS technology conditions.

Using the Krichevskii Function concept and the Kirkwood-Buff Theory, we have carried out a theoretical study of the interactions between CO₂ and CO, or CO₂ and CH₄ molecules. To this end we have calculated: (i) the Krichevskii function, J , and the Krichevskii parameter, A_{Kr} , which reflect the change experimented by the pressure when replacing a molecule of solvent by another of solute in infinitely dilute solutions, IDS, at constant T and V ; (ii) the partial molar volume of the solute at infinite dilution, \bar{V}_2^∞ ; (iii) the direct correlation function integrals, C_{ij} ; (iv) the excess coordination number, N_{exc}^∞ ; and (v) the affinity of the solvent per solute molecule, or cluster size, N_1^{exc} . From the sign of the Krichevskii parameter, A_{Kr} , its dimensionless counterpart, A_{Kr}^* , and the divergence signs for different structural properties in the systems studied ($A_{Kr} > 0$; $\bar{V}_2^\infty \rightarrow +\infty$; $N_{exc}^\infty \rightarrow -\infty$; $1 > A_{Kr}^* > 0$; $N_1^{exc} \rightarrow +\infty$), we can conclude that these mixtures exhibit weakly attractive behaviour.

We have proven that the presence of impurities in CO₂, even in small proportions, modifies the properties of mixtures. This results, in turn, in a modification of the parameters related to the design and operation in the process of fluid transport, depending on the nature of the mixture, the pressure and the temperature, and must be taken into account in the planning of CCS facilities. In this paper we have quantified the effect of small amounts of CH₄ and CO in CO₂ transport through various normalized

parameters (related to their corresponding values when the fluid to be transported is pure CO₂). The parameters studied were: pipeline inner diameter, D , erosional velocity, v_E , transport velocity, v , Reynolds number, Re , booster capacity, W , mass flow, m , Darcy-Weisbach friction factor, f , and pressure drop, ΔP . Differences with respect to pure CO₂ increase with increasing temperature and decreasing pressure, becoming important (up to 75% in some cases) for $8.6 \text{ MPa} < P < 10 \text{ MPa}$ (working operating pressures in transport), and converge to smaller values (less than 10%) for $P > 15 \text{ MPa}$.

We have observed, in all the properties studied in this work (volumetric, structural and operational for CCS technology), that the presence of CO as an impurity in anthropogenic CO₂ produces a greater disruption in relation to pure CO₂ than that of CH₄.

Acknowledgements

The authors gratefully acknowledge financial support received from the Ministerio de Educación y Ciencia of Spain (CTQ2005-02213), Ministerio de Ciencia e Innovación (CTQ2008-02037) and (CTQ2011-24875), Convenio La Caixa - Gobierno de Aragón, and Universidad de Zaragoza (UZ2012-CIE-13).

Appendix A.

Relation between period, τ , and density, ρ .

$$\rho(P, T) = \left(\frac{M_0}{V_i(P, T)} \right) \left[\left(\frac{K(P, T)}{K_0(T)} \right) \left(\frac{\tau^2(P, T)}{\tau_0^2(T)} \right) - 1 \right] \quad (\text{A1})$$

$$\rho(P, T) = \rho_{ref}(P, T) \frac{\left(\frac{K(P, T)}{K_0(T)} \right) (\tau^2(P, T) - \tau_0^2(T))}{\left(\frac{K(P, T)}{K_0(T)} \right) (\tau_{ref}^2(P, T) - \tau_0^2(T))} \quad (\text{A2})$$

Where

$\rho(P, T)$ is the density of the inner fluid to be determined at pressure P and temperature T

$\rho_{ref}(P, T)$ is the density of the reference fluid at pressure P and temperature T

M_0 is the mass of the vibrating tube under vacuum

$V_i(P, T)$ is the internal volume of the vibrating tube at pressure P and temperature T

$K(P, T)$ is the transversal stiffness of the vibrating tube at pressure P and temperature T

$K_0(T)$ is the transversal stiffness under vacuum of the vibrating tube at temperature T

$\tau(P, T)$ is the period of the vibrating tube with inner fluid to be determined at pressure P and temperature T

$\tau_{ref}(P, T)$ is the period of the vibrating tube with reference fluid at pressure P and temperature T

$\tau_0(T)$ is the period under vacuum of the vibrating tube at temperature T

Uncertainty, $U(y)$

The expanded ($k=2$) uncertainty in the density, ρ , excess molar volumes, V_m^E , and solute molar partial volumes, \bar{V}_2 , have been calculated by the rules of error propagation law (JCGM 100, 2008):

$$U(y) = ku_c(y) = k \left[\sum_{i=1}^N \left(\frac{\partial f}{\partial x_i} \right)^2 u^2(x_i) \right]^{\frac{1}{2}} \quad (\text{A3})$$

Where

k is the coverage factor

$u_c(y)$ is the combined standard uncertainty of the estimated y

x_i represent the input variables

$(\partial f / \partial x_i)$ is the sensitivity coefficient of the input variable x_i

$u^2(x_i)$ is the variance of x_i

Relative Mean Standard Deviation, $\overline{S_x^r}$, and Mean Relative Deviation, MRD_x

The relative mean standard deviation is calculated:

$$\overline{S_x^r} = \frac{100}{N} \sum_{j=1}^N ({}_j S_x^r) \quad (A4)$$

Where ${}_j S_x^r$ is the relative standard deviation by point:

$${}_j S_x^r = \frac{{}_j S_x}{\frac{1}{n} \sum_{i=1}^n x_i^{exp}} \quad (A5)$$

and ${}_j S_x$ is the standard deviation by point:

$${}_j S_x = \sqrt{\frac{n \sum_{i=1}^n (x_i^{exp})^2 - (\sum_{i=1}^n x_i^{exp})^2}{n(n-1)}} \quad (A6)$$

The relative mean deviation is calculated:

$$MRD_x = \frac{100}{N} \sum_{i=1}^N \left| \frac{x_i^{exp} - x_i^*}{x_i^{exp}} \right| \quad (A7)$$

Where x_i^{exp} are experimental data

x_i^* are bibliographic or calculated values

N is the number of points

n is the number of analysis for given T and P

Appendix B. Supplementary data.

Supplementary data associated with this article can be found in its online version.

References

- Abdulagatov, A.I., Stepanov, G.V., Abdulagatov, I.M., 2007. The critical properties of binary mixtures containing carbon dioxide: Krichevskii parameter and related thermodynamic properties. *High Temperature* 45, 408-424.
- Al-Nehlawi, A., Saldo, J., Vega, L.F., Guri, S., 2013. Effect of high carbon dioxide atmosphere packaging and soluble gas stabilization pre-treatment on the shelf-life and quality of chicken drumsticks. *Meat Science* 94, 1-8.
- Arai, Y., Kaminishi, G., Saito, S., 1971. The experimental determination of the P - V - T - x relations for the carbon dioxide-nitrogen and the carbon dioxide-methane systems. *Journal Chemical & Engineering Japan* 4, 113–122.
- Baglin, F.G., Murray, S.K., Daugherty, J.E., Palmer, T.E., Stanbery, W., 2000. Interaction induced Raman light scattering as a probe of the local density structure of binary supercritical solutions. *Molecular Physics* 98, 409-418.
- Beer, H., 1969. Compressibility factors for the argon-carbon dioxide system. *Canadian Journal of Chemical Engineering* 47, 92–94.
- Ben-Naim, A., 1977. Inversion of the Kirkwood-Buff theory of solutions: Application to the water-ethanol system. *Journal of Chemical Physics* 67, 4884-4890.
- Bian, B., Wang, Y., Shi, J., Zhao, E., Lu, B.C.-Y., 1993. Simultaneous Determination of vapor-liquid equilibrium and molar volumes for coexisting phases up to the critical temperature with a static method. *Fluid Phase Equilibria* 90, 177-187.
- Blanco, S. T., Gil, L., García-Giménez, P., Artal, M., Otín S., Velasco, I., 2009. Critical properties and high-pressure volumetric behaviour of the carbon dioxide + propane system at $t = 308.15$ K. Krichevskii function and related thermodynamic properties. *Journal of Physical Chemistry B* 113, 7243-7256.

- Blanco, S.T., Rivas, C., Fernández, J., Artal, M., Velasco, I., 2012. Influence of methane in CO₂ transport and storage for CCS technology. *Environmental Science & Technology* 46, 13016–13023.
- Bouchot, C., Richon, D., 2001. An enhanced method to calibrate vibrating tube densimeters. *Fluid Phase Equilibria* 191, 189-208.
- Brugge, H.B., Hwang, C.A., Rogers, W.J., Holste, J.C., Hall, K.R., Lemming, W., Esper, G.J., Marsh, K.N., Gammon, B.E., 1989. Experimental cross virial coefficients for binary mixtures of carbon dioxide with nitrogen, methane and ethane at 300 and 320 K. *Physica A* 156, 382–416.
- Chialvo, A.A., Cummings, P.T., 1995. Comment on “Near critical phase behaviour of dilute mixtures”. *Molecular Physics* 84, 41-48.
- Cipollina, A., Anselmo, R., Scialdone, O., Filardo, G., Galia, A., 2007. Experimental *P-T-ρ* measurements of supercritical mixtures of carbon dioxide, carbon monoxide, and hydrogen and semiquantitative estimation of their solvent power using the solubility parameter concept. *Journal of Chemical & Engineering Data* 52, 2291-2297.
- Cismondi, M., Brignole, E.A., Mollerup, J., 2005. Rescaling of Three-Parameter Equations of State: PC-SAFT and SPHCT. *Fluid Phase Equilibria* 234, 108-121.
- Debenedetti, P.G., Mohamed, R.S., 1989. Attractive, weakly attractive, and repulsive near-critical systems. *Journal of Chemical Physics* 90, 4528-4536.
- Donnelly, H.G., Katz, D.L., 1954. Phase equilibria in the carbon dioxide-methane system. *Industrial and Engineering Chemistry* 46, 511-517.

ElementEnergy, 2010. CO₂ pipeline infrastructure: An analysis of global challenges and opportunities. Final report for IEA Greenhouse Gas Programme, 1–134. EON UK, 2011. Kingsnorth carbon capture & storage project. Post-FEED Project Cost.

ENCAP-WP1.1, Deliverable D1.1.1 & D1.1.2, 2008. Reference cases and guidelines for technology concepts, Vattenfall A/S Report No.: 55431 Issue No. 4.

Esper, G.J., 1987. Fortschritt-Berichte VDI, Reihe 3, Nr. 148, VDI-Verlag, Düsseldorf.

Furuja, T., Teja, A.S., 2000. Krichevskii Parameters and the Solubility of Heavy n-Alkanes in Supercritical Carbon Dioxide. Industrial & Engineering Chemical Research 39, 4828-4830.

Ghasemi, M., Daud, W.R.W., Hassan, S.H.A., Oh, S-E., Ismail, M., Rahimnejad, M., Jahim, J.Md, 2013. Nano-structured carbon as electrode material in microbial fuel cells: A comprehensive review. Journal of Alloys and Compounds 580, 245-255.

Gil, L., Otín, S., Muñoz Embid, J., Gallardo, A., Blanco, S.T., Artal M., Velasco I., 2008. Experimental setup to measure critical properties of pure and binary mixtures and their densities at different pressures and temperatures: Determination of the precision and uncertainty in the results. Journal of the Supercritical Fluids 44, 123-138.

Gil, L., Martínez-López, J.F., Artal, M., Blanco, S.T., Muñoz Embid, J., Fernández, J., Otín, S., Velasco, I., 2010. Volumetric behaviour of the {CO₂ (1) + C₂H₆ (2)} system in the subcritical (T = 293.15 K), critical, and supercritical (T = 308.15 K) regions. Journal of Physical Chemistry B 114, 5447-5469.

Gil, L., Blanco, S.T., Rivas, C., Laga, E., Fernández, J., Artal, M., Velasco, I., 2012. Experimental determination of the critical loci for {n-C₆H₁₄ or CO₂+alkan-1-ol}

- mixtures. Evaluation of their critical and subcritical behaviour using PC-SAFT EoS. *Journal of the Supercritical Fluids* 71, 26-44.
- Gross, J., Sadowski, G., 2001. Perturbed-Chain SAFT: An Equation of State Based on a Perturbation Theory for Chain Molecules. *Industrial & Engineering Chemical Research* 40, 1244-1260.
- Gross, J., Sadowski, G., 2002. Application of the Perturbed-Chain SAFT Equation of State to Associating Systems. *Industrial & Engineering Chemical Research* 41, 5510-5515.
- Hwang, C.A., Iglesias-Silva, G.A., Holste, J.C., Hall, K.R., Gammon, B.E., Marsh, K.N., 1997. Densities of Carbon Dioxide + Methane Mixtures from 225 K to 350 K at Pressures up to 35 MPa. *Journal of Chemical & Engineering Data* 42, 897–899.
- IEA/CSLF Report to the Musoka 2010 g-8. Carbon Capture and Storage. Progress and Next Steps.
- Jaeschke, M., Humphreys, A. E., 1991. The GERG databank of high accuracy compressibility factor measurements. GERG TM4 1990. *Fortschritt-Berichte VDI, Reihe 6, Nr. 251*, VDI-Verlag, Düsseldorf.
- Jaeschke, M., Hinze, H.M., Humphreys, A.E., 1997. Supplement to the GERG databank of high accuracy compressibility factor measurements GERG TM7 1996. *Fortschritt-Berichte VDI, Reihe 6, Nr. 355*, VDI Verlag, Düsseldorf.
- Japas, M.L., Alvarez, J.L., Gutkowski, K., Fernandez-Prini, R., 1998. Determination of the Krichevskii function in near-critical dilute solutions of $I_2(s)$ and $CHI_3(s)$. *Journal of Chemical Thermodynamics* 30, 1603-1615.

- JCGM 100, 2008. Evaluation of measurement data – guide to expression of uncertainty in measurement; Joint Committee for Guides in Metrology: Servis Cedex, France.
- Ke, J., Han, B., George, M.W., Yan, H., Poliakoff, M., 2001. How Does the Critical Point Change during a Chemical Reaction in Supercritical Fluids? A Study of the Hydroformylation of Propene in Supercritical CO₂. *Journal of the American Chemical Society* 123, 3661-3670.
- Kirkwood, J.G., Buff, F.P., 1951. The statistical mechanical theory of solutions. I. *Journal of Chemical Physics* 19, 774-777.
- Klein, S.A., McLinden, M.O., Laesecke, A., 1997. An improved extended corresponding states method for estimation of viscosity of pure refrigerants and mixtures. *International Journal of the Refrigeration* 20, 208-217.
- Knoope, M.M.J., Ramírez, A., Faaij, A.P.C., 2013. A state-of-the-art review of techno-economic models predicting the costs of CO₂ pipeline transport. *International Journal of Greenhouse Gas Control* 16, 241-270.
- O. Kunz, O., Wagner, W., 2012. The GERG-2008 Wide-Range Equation of State for Natural Gases and Other Mixtures: An Expansion of GERG-2004. *Journal of Chemical & Engineering Data* 57, 3032–3091.
- Lachet, V., Creton, B., deBruin, T., Bourasseau, E., Desbiens, N., Wilhelmsen, O., Hammer, M., 2012. Equilibrium and transport properties of CO₂ + N₂O and CO₂ + NO mixtures: Molecular simulation and equation of state modelling study. *Fluid Phase Equilibria* 322-323, 66-78.
- Laursen, T., 2012. VLXE ApS; Scion-DTU: Diplomvej, Denmark.

- Lee, L.L., Cochran, H.D., 1994. Integral equations for microstructures of supercritical fluids, in: Kiran, E., Levelt Sengers, J.M.H. (Eds.), *Supercritical Fluids: Fundamentals for Application*. NATO, ASI Ser. Vol. 273: Kluwer Academic Publishers, The Netherlands, pp. 365-383.
- Lemming, W., 1989. Fortschritt-Berichte VDI, Reihe 19, Nr. 32, VDI-Verlag, Düsseldorf.
- Lemmon, E.W., Huber, M.L., McLinden, M.O., 2010. NIST Standard Reference Database 23: Reference Fluid Thermodynamic and Transport Properties-REFPROP, Version 9.0, National Institute of Standards and Technology, Standard Reference Data Program, Gaithersburg.
- Levelt Sengers, J.M.H., 1994. Critical behavior of fluids: concepts and applications, in: Kiran, E., Levelt Sengers, J.M.H. (Eds.), *Supercritical Fluids: Fundamentals for Application*, NATO, ASI Ser. Vol. 273: Kluwer Academic Publishers, The Netherlands, pp. 3-38.
- Li, H., Jakobsen, J. P., Wilhelmsen, O., Yan, J., 2011a. PVTxy properties of CO₂ mixtures relevant for CO₂ capture, transport and storage: Review of available experimental data and theoretical models. *Applied Energy* 88, 3567-3579.
- Li, H., Wilhelmsen, O., Lv, Y., Wang, W., Yan, J., 2011b. Viscosities, thermal conductivities and diffusion coefficients of CO₂ mixtures: Review of experimental data and theoretical models. *International Journal of Greenhouse Gas Control* 5, 1119-1139.
- Liu, Y., Wilcox, J., 2013. Molecular Simulation Studies of CO₂ Adsorption by Carbon Model Compounds for Carbon Capture and Sequestration Applications. *Environmental Science & Technology*. [dx.doi.org/10.1021/es3012029](https://doi.org/10.1021/es3012029).

- Magee, J.W., Ely, J.F., 1988. Isochoric (p, v, T) Measurements on CO₂ and (0.98 CO₂ + 0.02 CH₄) from 225 to 400 K and Pressures to 35 MPa. *International Journal of Thermophysics* 9, 547–557.
- Mallu, B.V., Natarajan, G., Viswanath, D.S., 1987. Compression factors and second virial coefficients of CO₂, CO, and $\{x \text{ CO} + (1-x) \text{ CO}_2\}$. *Journal of Chemical Thermodynamics* 19, 549-554.
- Mallu, B. V., Viswanath, D. S., 1990. Compression factors and second virial coefficients of hydrogen, methane and carbon dioxide mixtures $\{x \text{ CO}_2 + (1 - x) \text{ H}_2\}$, and $\{x \text{ CO}_2 + (1 - x) \text{ CH}_4\}$. *Journal of Chemical Thermodynamics* 22, 997-1006.
- McElroy, P.J., Battino, R., Dowd, M.K., 1989. Compression-factor measurements on methane, carbon dioxide, and (methane + carbon dioxide) using a weighing method. *Journal of Chemical Thermodynamics* 21, 1287–1300.
- Móndejar, M.E., Fernández-Vicente, T.E., Haloua, F., Chamorro, C.R., 2012. Experimental determination of (P, ρ, T) data for three mixtures of carbon dioxide with methane for the thermodynamic characterization of nonconventional energy gases. *Journal of Chemical & Engineering Data* 57, 2581-2588.
- Ornstein, L.S., Zernike, F., 1914. Accidental deviations of density and opalescence at the critical point of a single substance. *Proceedings of the Koninklijke Akademie van Wetenschappen te Amsterdam* 17, 793-806.
- Parris, P., 2010. Molecular simulation studies in the supercritical region. Thesis, University College London, London WC1E 7JE.
- Peng, D. Y., Robinson, D. B., 1976. A new two-constant equation of state. *Industrial & Engineering Chemical Fundamentals* 15, 59–64.

- Ramachandriya, K.D., Kundiyana, D.K., Wilkins, M.R., Terrill, J.B., Atiyeh, H.K., Huhnke, R.L., 2013. Carbon dioxide conversion to fuels and chemicals using a hybrid green process. *Applied Energy* 112, 289-299.
- Reamer, H.H., Olds, R.H., Sage, B.H., Lacey, W.N., 1944. Phase equilibria in hydrocarbon systems. *Industrial & Engineering Chemistry* 36, 88–90.
- Sánchez-Vicente, Y., Drage, T.C., Poliakoff, M., Ke, J., George, M.W., 2013. Densities of the carbon dioxide+hydrogen, a system of relevance to carbon capture and storage. *International Journal of Greenhouse Gas Control* 13, 78-86.
- Seevam, P.N., Race, J.M., Downie, J.M., Hopkins, P., 2008. Transporting the next generation of CO₂ for carbon, capture and storage: the impact of impurities on supercritical CO₂ pipelines. *Proceedings of IPC2008 7th international pipeline conference (Canada)*, 39-51.
- Seitz, J.C., Blencoe, J.G., 1996. Volumetric properties for $\{(1-x)\text{CO}_2 + x\text{CH}_4\}$, $\{(1-x)\text{CO}_2 + x\text{N}_2\}$, and $\{(1-x)\text{CH}_4 + x\text{N}_2\}$ at the pressures (19.94, 29.94, 39.94, 59.93, 79.93, and 99.93) MPa and the temperature 673.15 K. *Journal of Chemical Thermodynamics* 28, 1207-1213.
- Seitz, J.C., Blencoe, J.G., Bodnar, R.J., 1996. Volumetric properties of for $\{(1-x)\text{CO}_2 + x\text{CH}_4\}$, $\{(1-x)\text{CO}_2 + x\text{N}_2\}$, and $\{(1-x)\text{CH}_4 + x\text{N}_2\}$ at the temperatures (323.15, 373.15, 473.15, 573.15) K and pressures (9.84, 19.84, 29.84, 39.84, 59.83, 79.83, 99.83) MPa. *Journal of Chemical Thermodynamics* 28, 521–538.
- Serpa, J., Morbee, J., Tzimas, E., 2011. Technical and economic characteristics of a CO₂ transmission pipeline infrastructure. *JRC62502*, 1-43.
- Simon, R., Fesmire, C.J., Dicharry, R.M., Vorhis, F.H., 1977. Compressibility factors for carbon dioxide–methane mixtures. *Journal of Petroleum Technology* 29, 81–85.

- Skarmoutsos, I., Samios, J., 2006. Local intermolecular structure and dynamics in binary supercritical solutions. A molecular dynamics simulation study of methane in carbon dioxide. *Journal of Molecular Liquids* 125, 181-186.
- Span, R., Wagner, W., 1996. A new equation of state for carbon dioxide covering the fluid region from the triple-point temperature to 1100 K at pressures up to 800 MPa. *Journal of Physical and Chemical Reference Data* 25, 1509-1596.
- J. P. Martin Trusler, J.P.M., 2011. Equation of State for Solid Phase I of Carbon Dioxide Valid for Temperatures up to 800 K and Pressures up to 12 GPa. *Journal of Physical and Chemical Reference Data* 40, 043105.
- J. P. Martin Trusler, J.P.M., 2012. Erratum: Equation of State for Solid Phase I of Carbon Dioxide Valid for Temperatures up to 800 K and Pressures up to 12 GPa [J. Phys. Chem. Ref. Data 40, 043105 (2011)]. *Journal of Physical and Chemical Reference Data* 41, 039901.
- Vandeginste, V., Piessens, K., 2008. Pipeline design for a least - cost router application for CO₂ transport in the CO₂ sequestration cycle. *International Journal of Greenhouse Gas Control* 2, 571-581.
- Velasco, I., Rivas, C., Martínez-Lopez, J.F., Blanco, S.T., Otín, S., Artal, M., 2011. Accurate values of some thermodynamic properties for carbon dioxide, ethane, propane, and some binary mixtures. *Journal of Physical Chemistry B* 115, 8216–8230.
- Vo, H.T., Imai, T., Teeka, J., Sekine, M., Kanno, A., Le, T.V., Higuchi, T., Phummala, K., Yamamoto, K., 2013. Comparison of disinfection effect of pressurized gases of CO₂, N₂O, and N₂ on *Escherichia coli*. *Water Research* 47, 4286-4293.

- Wheeler, J.C., 1972. Behaviour of a solute near the critical point of an almost pure solvent. *Berichte der Bunsengesellschaft für physikalische Chemie* 76, 308-318.
- Wöll, O., El Hawary, T., 2003. Private communication, Lehrstuhl für Thermodynamik, Ruhr-Universität Bochum.
- Zhang, J., Zhang, X., Han, B., He, H., Liu, Z., Yang, G., 2002. Study on intermolecular interactions in supercritical fluids by partial molar volume and isothermal compressibility. *Journal of Supercritical Fluids* 22, 15-19.

Figure Captions

Fig. 1. Experimental densities, ρ , for CO₂ + CH₄ mixtures at $T = T_c(\text{CO}_2) = 304.21$ K and several pressures.

Fig. 2. Experimental densities, ρ , for CO₂ + CO mixtures at $T = T_c(\text{CO}_2) = 304.21$ K and several pressures.

Fig. 3. Experimental densities, ρ , for CO₂ + CO mixtures at $T = 308.15$ K and several pressures.

Fig. 4. $\kappa_T - x_{\text{CO}_2} - P$ representations for CO₂ + CH₄ mixtures at $T = T_c(\text{CO}_2) = 304.21$ K.

Fig. 5. $\kappa_T - x_{\text{CO}_2} - P$ representations for CO₂ + CO mixtures at $T = T_c(\text{CO}_2) = 304.21$ K.

Fig. 6. $V_m^E - P$ representation for studied systems at $T = T_c(\text{CO}_2) = 304.21$ K and $T = 308.15$ K, $x_{\text{CO}_2} \cong 0.971$ and $x_{\text{CO}_2} \cong 0.993$ mole fractions.

Fig. 7. Solute partial molar volume, \bar{V}_2 , versus solute mole fraction, $x_{\text{CH}_4, \text{CO}}$, for studied systems at $P = 7.383$ and 8.000 MPa and at $T = 304.21$ and $T = 308.15$ K.

Fig. 8. The relative deviation between the experimental densities and the values calculated using different EoS, for several mixtures studied in this work. (a) $T = 304.21$ K; (b) $T = 308.15$ K.

Fig. 9. (a) $P - x_{\text{CH}_4}$ data for {CO₂ (1) + CH₄ (2)} dilute mixtures and (b) $P - x_{\text{CO}}$ data for {CO₂ (1) + CO (2)} dilute mixtures, for several isochores at $T = 304.21$ K.

Fig. 10. Krichevskii function, J , versus density of the pure solvent, ρ_{CO_2} , for the {CO₂ (1) + CH₄ (2)} and {CO₂ (1) + CO (2)} systems at $T = 304.21$ K and $T = 308.15$ K.

Fig. 11. Affinity of solvent molecules for a solute molecule (cluster size), N_1^{exc} , versus density of the pure solvent, ρ_{CO_2} , for the {CO₂ (1) + CH₄ (2)} and {CO₂ (1) + CO (2)} systems at $T = 304.21$ K and $T = 308.15$ K.

Fig. 12 Comparison of normalized pipeline inner diameter, D/D_0 , (for a given mass flow and transport velocity) or erosional velocity, v_E/v_{E_0} , for mixtures $\text{CO}_2 + \text{CH}_4$ or $+ \text{CO}$ with $x_{\text{CO}_2} \cong 0.97$.

Fig. 13. Comparison of normalized pressure drop, $\Delta P/\Delta P_0$, for a mass flow of 317 kg/s (10 Mt/year), a pipeline inner diameter of 0.508 m (20 inch) and a roughness height of 4.6×10^{-5} m (0.00015 ft) for mixtures $\text{CO}_2 + \text{CH}_4$ or $+ \text{CO}$ with $x_{\text{CO}_2} \cong 0.97$.

Fig. 1.

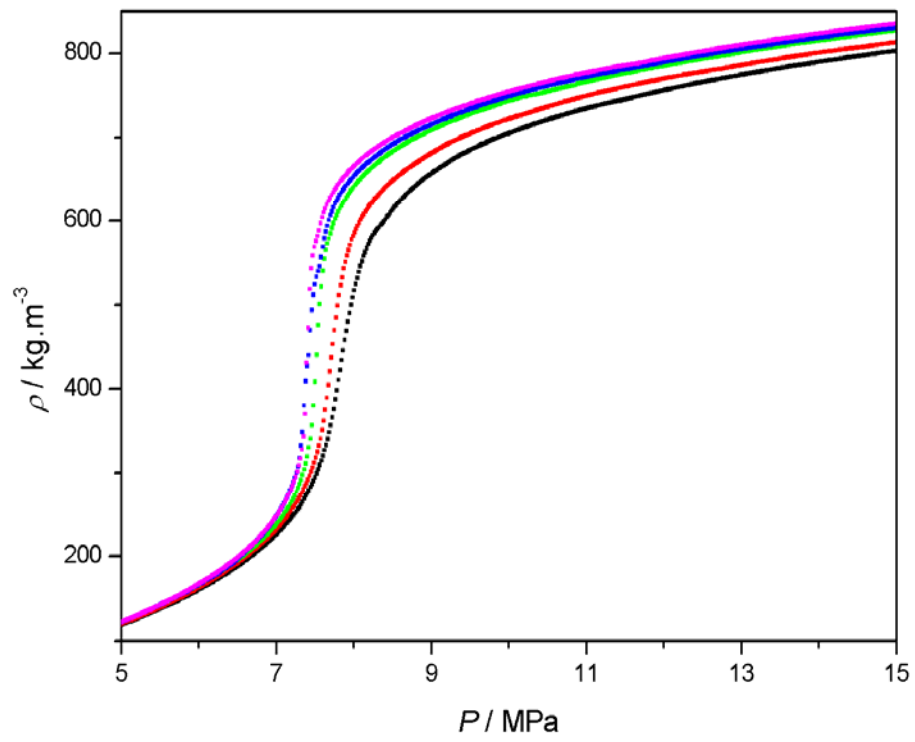


Fig. 2.

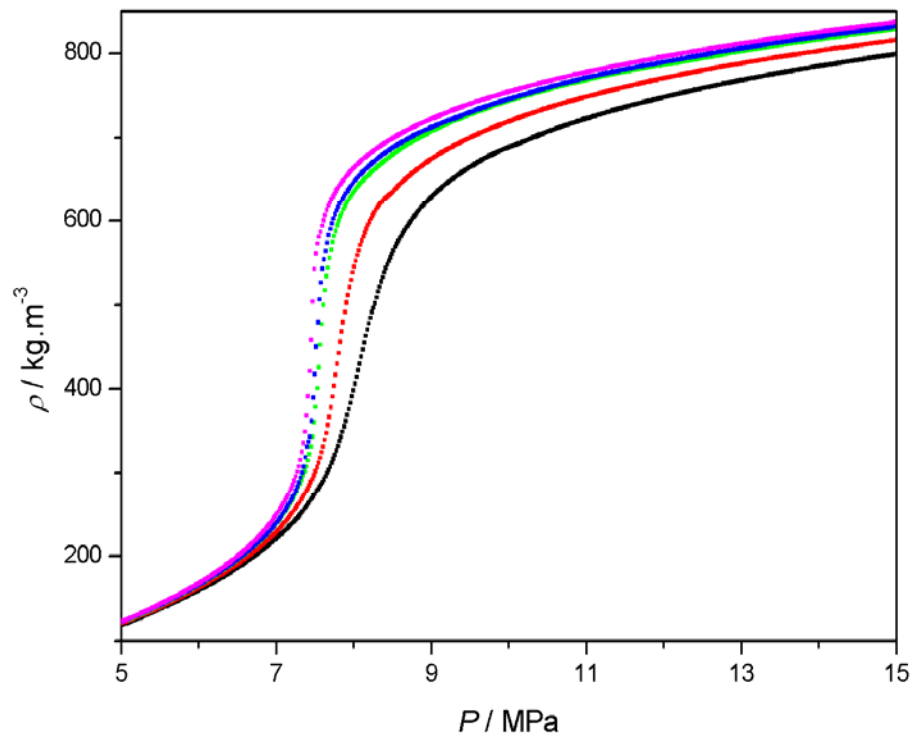


Fig. 3.

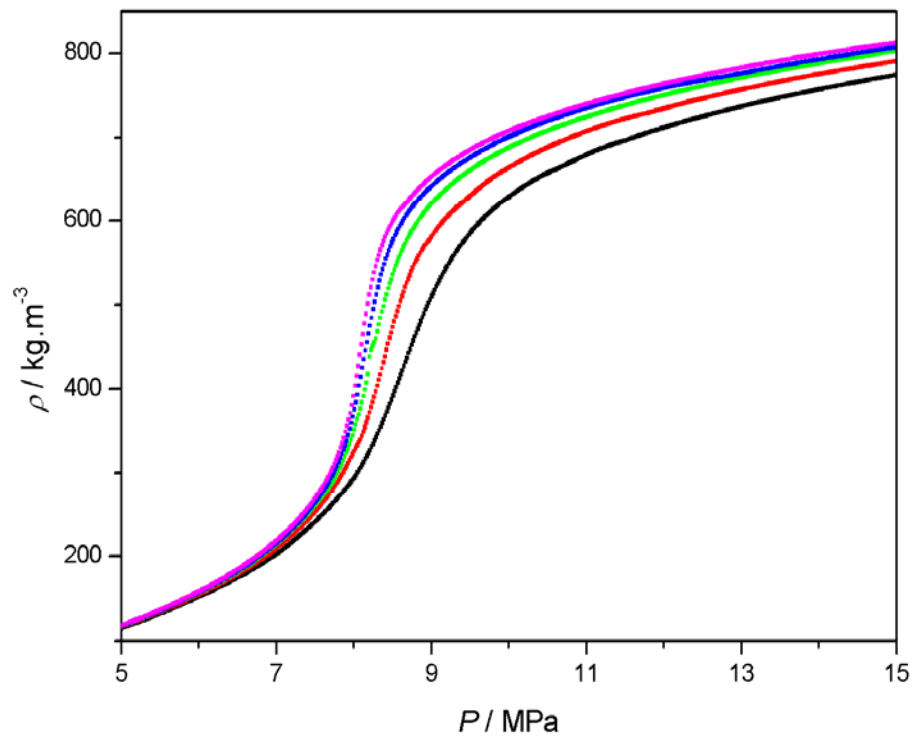


Fig.4.

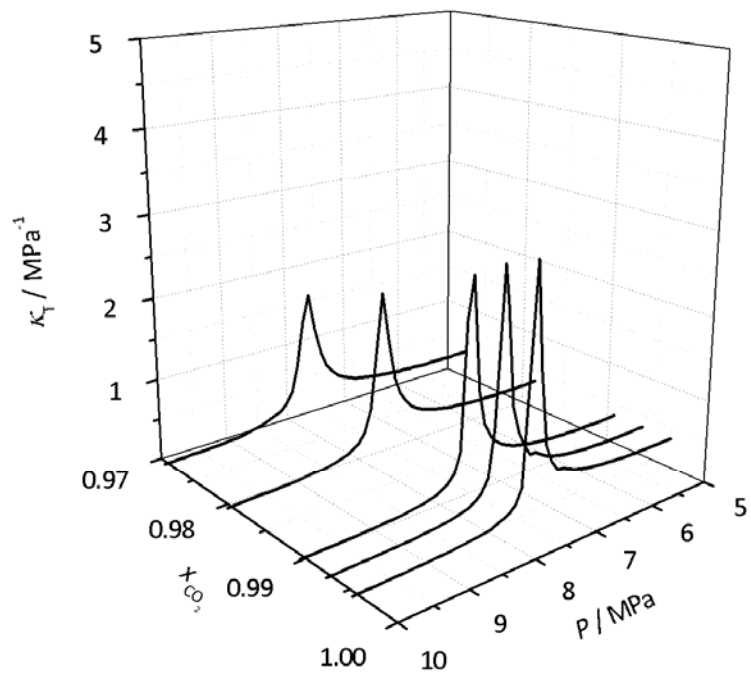


Fig. 5.

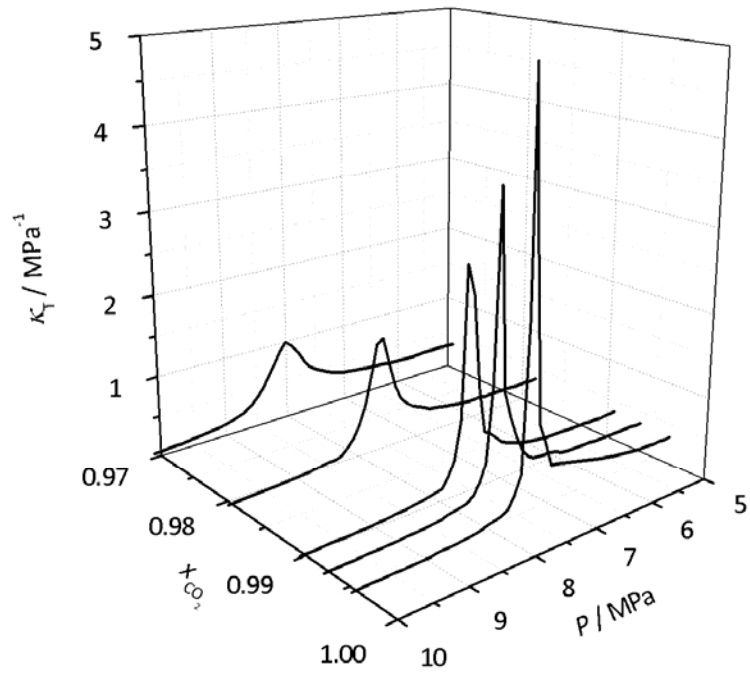


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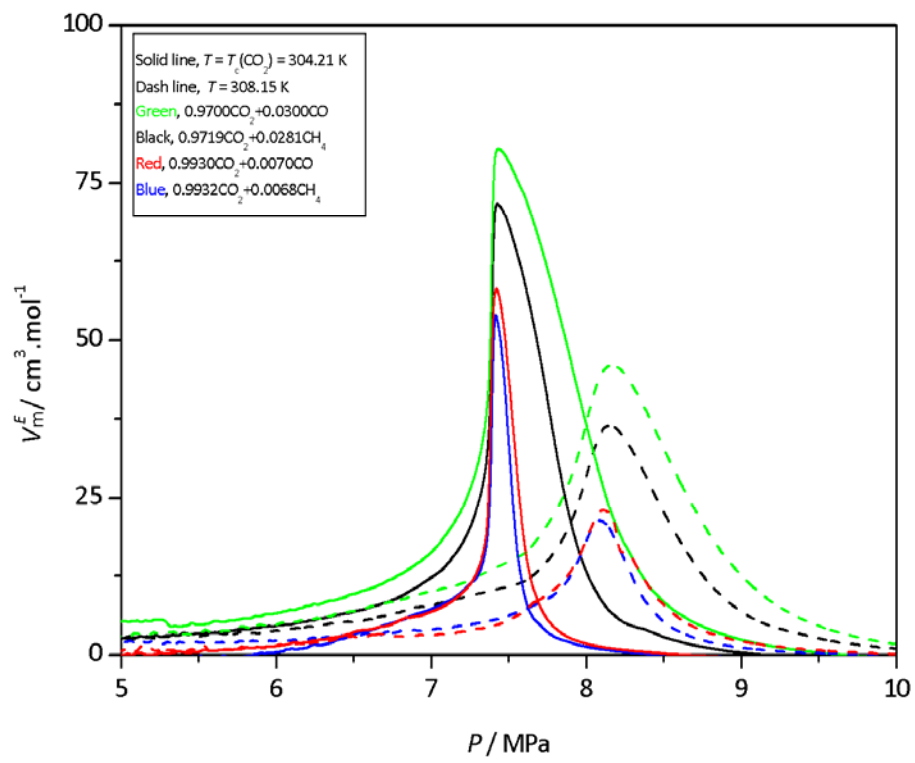


Fig. 7.

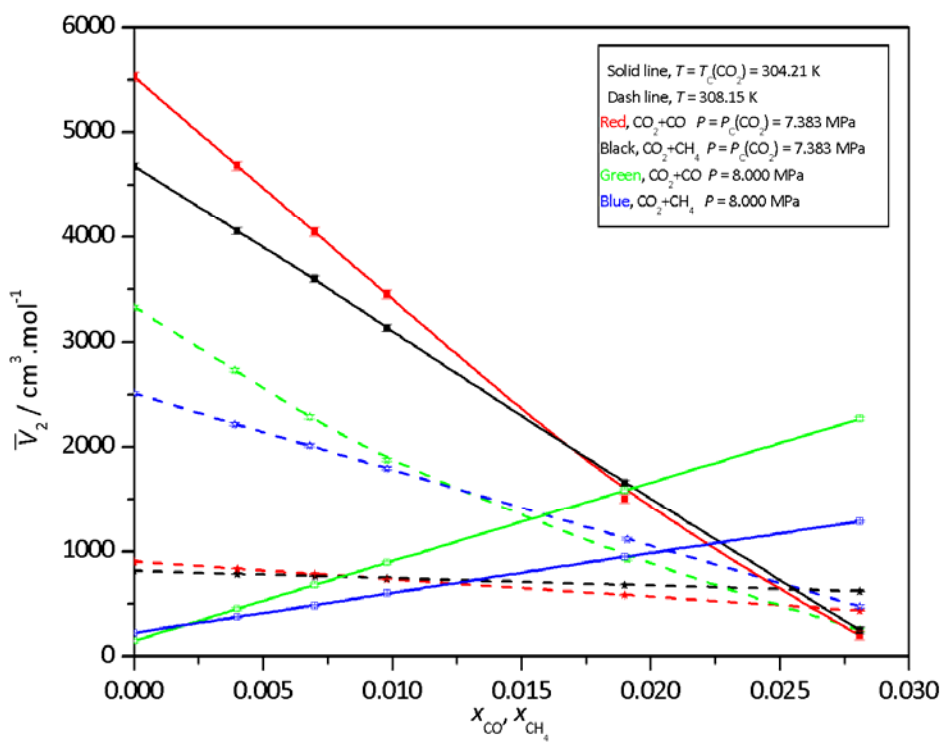
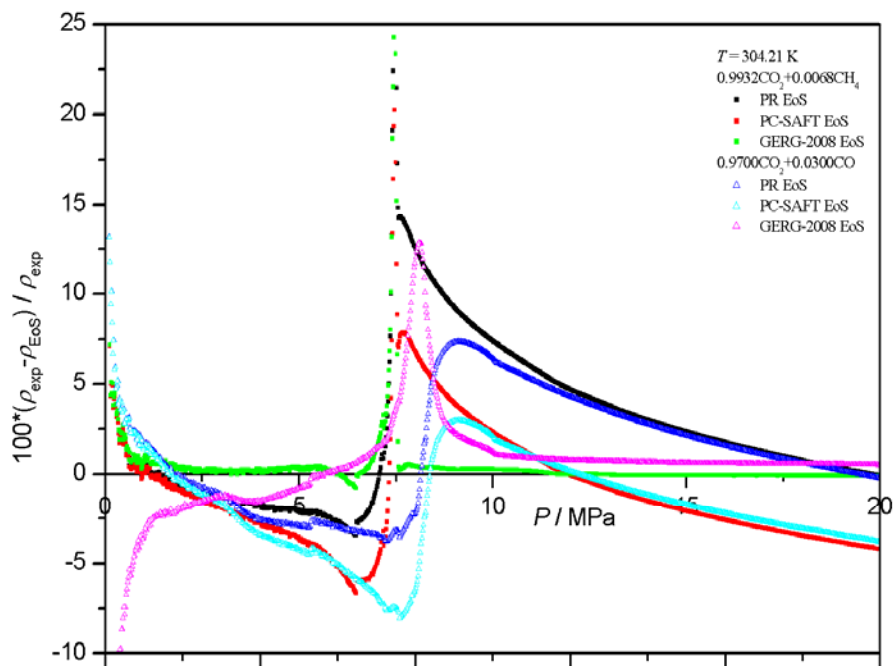


Fig. 8.

(a)



(b)

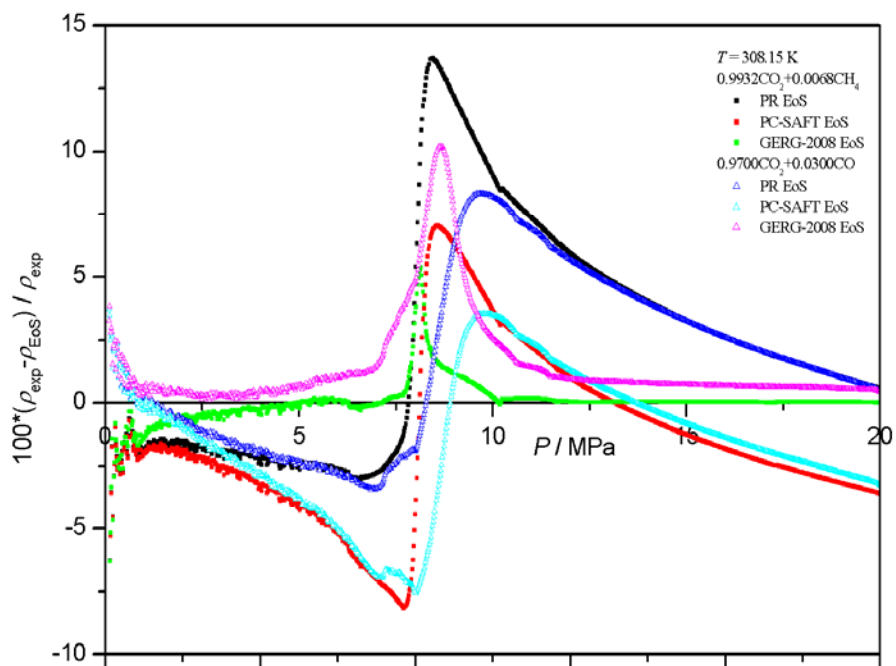
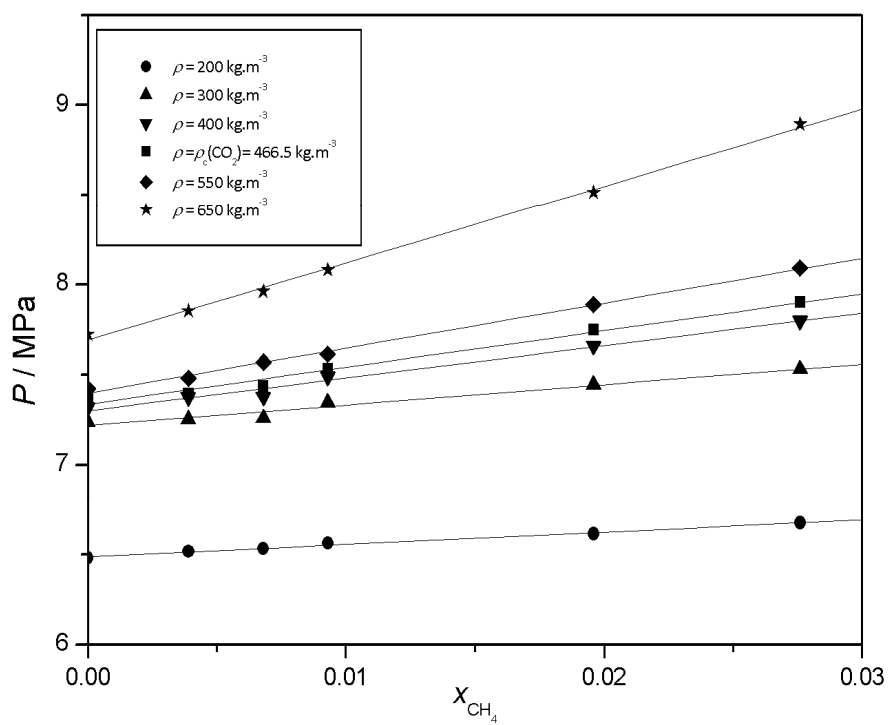


Fig. 9.

(c)



(d)

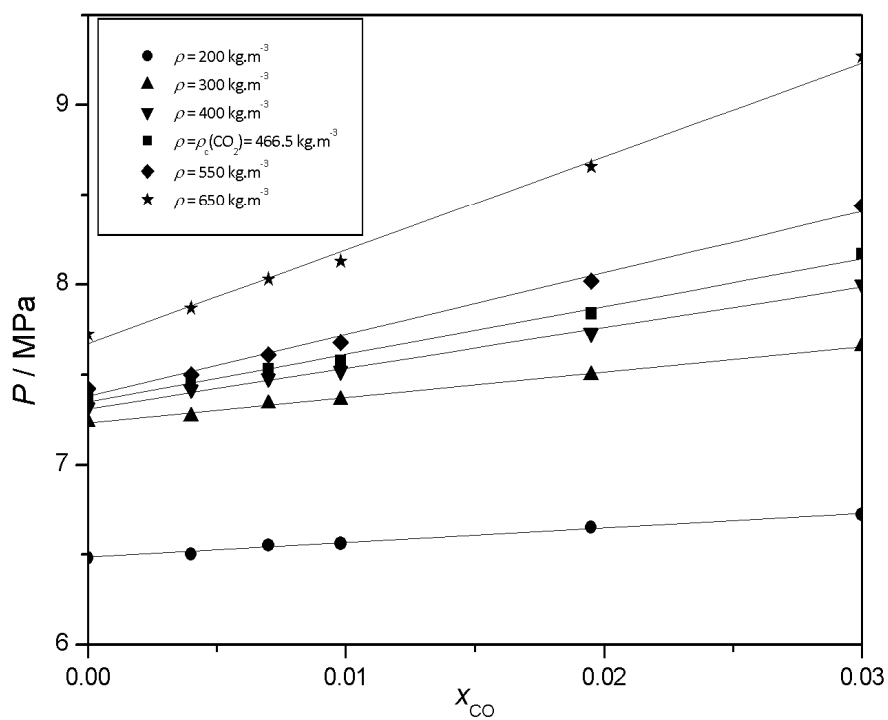


Fig. 10.

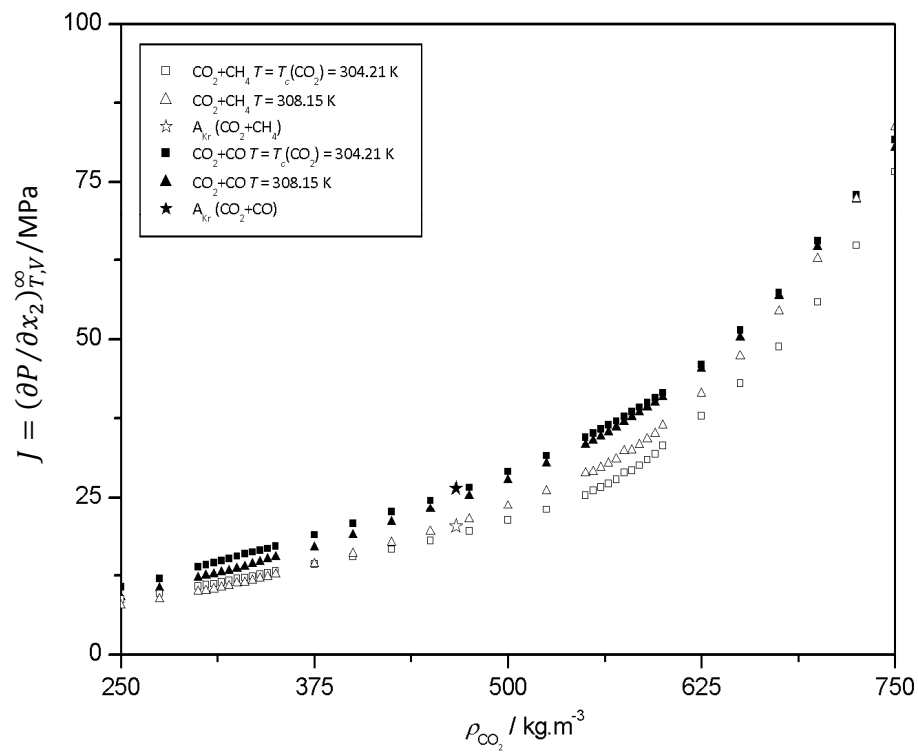


Fig. 11.

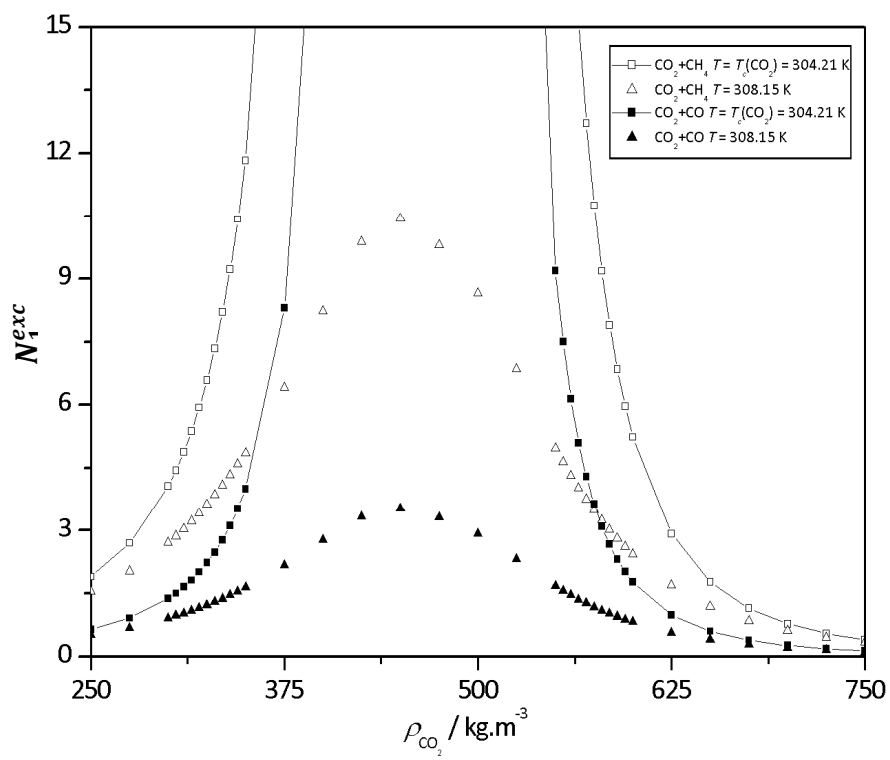


Fig. 12.

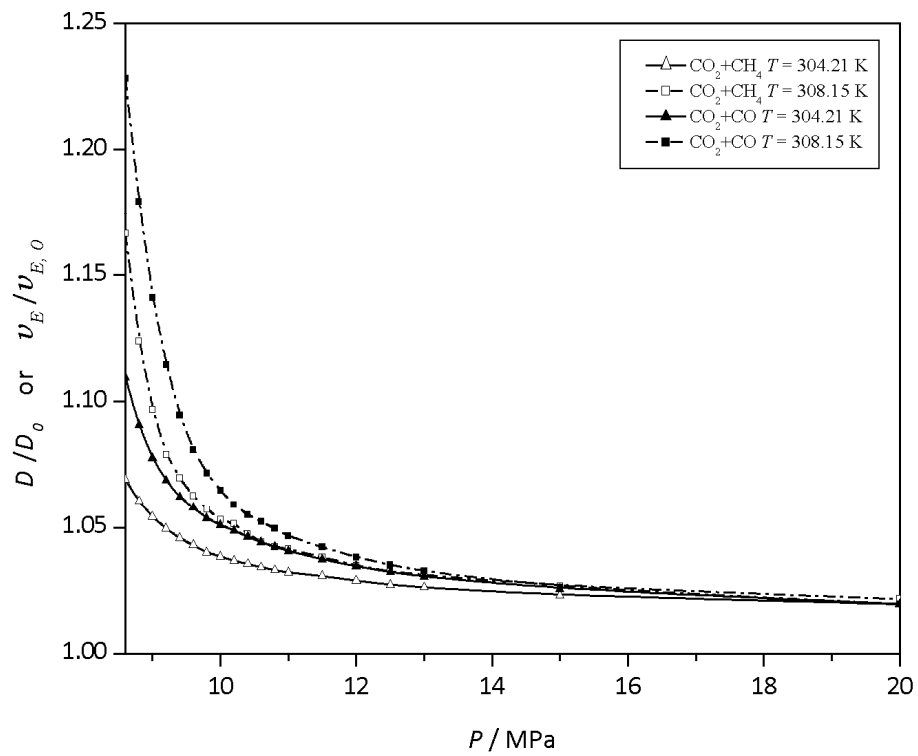


Fig. 13.

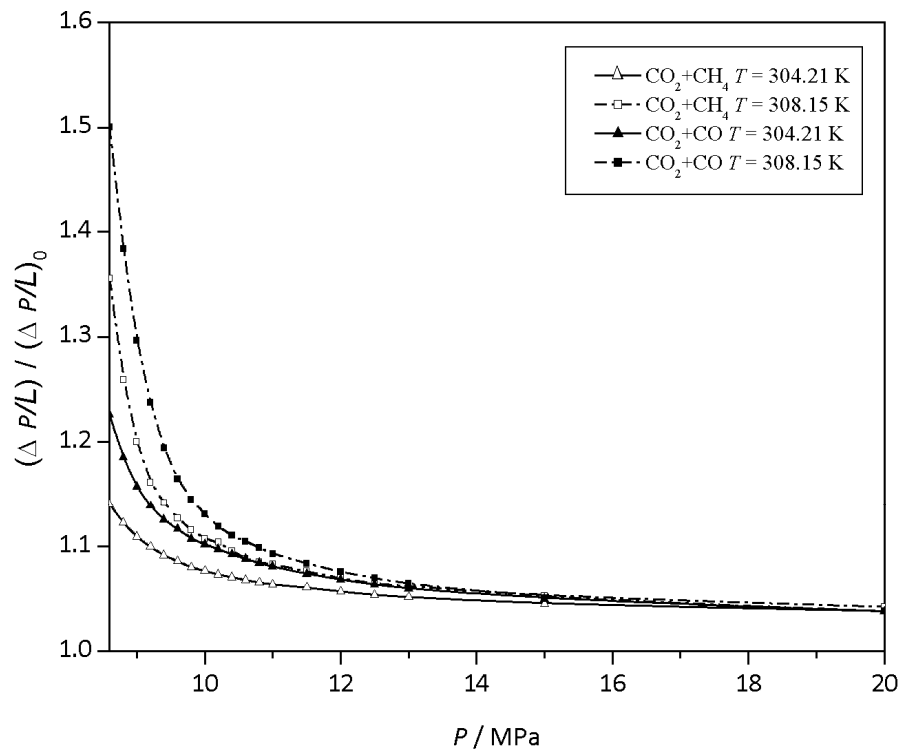


Table 1.Summary of T - P - x_{CO_2} ranges of mixtures studied in this work.

System	No. Points	Range T / K	Range P / MPa	Range x_{CO_2}	Reference
CO ₂ + CH ₄	476	311-478	1.4-68.9	0.15-0.80	Reamer et al., 1944
	28	293-453	4.1-19.3	0.20-0.80	Beer, 1969
	186	253-288	2.4-14.5	0.45-0.96	Arai et al., 1971
	63	283-322	4.7-20.7	0.91	Simon et al., 1977
	118	220-320	0.1-48.3	0.48	Esper, 1987
	91	225-400	2.1-35.8	0.98	Magee and Ely, 1988
	155	300-320	0.2-9.8	0.10-0.90	Brugge et al., 1989
	28	289	0.03-6.7	0.1	Lemming, 1989
	64	323-398	0.1-6.5	0.482	Mallu and Viswanath, 1990
	298	270-350	0.2-28.4	0.31	Jaeschke and Humphreys, 1991
	149	279-308	3.7-6.4	0.10-0.48	Jaeschke et al., 1996
	44	673	19.9-99.9	0.10-0.90	Seitz and Blencoe, 1996
	194	323-573	9.9-99.9	0.10-0.90	Seitz et al., 1996
	228	225-350	1.8-69.5	0.10-0.90	Hwang et al., 1997
	17	273-290	2.0-9.5	0.06-0.15	Claus et al., 2001
	22	308	5.4-12.1	0.997	Zhang et al., 2002
	324	233-373	0.2-20.7	0.08-0.15	Wöll and El-Hawary, 2003
	315	250-400	1-20	0.20-0.60	Mondéjar et al., 2012
49,000	253-333	0.1-20	0.85-0.996	Blanco et al., 2012	
5,000	304	0.1-20	0.97-0.996	This work	
CO ₂ + CO	75	323-423	0.1-6.5	0.57	Mallu et al., 1987
	56	308-343	26.0-47.0	0.86-0.93	Cipollina et al., 2007
	10,000	304-308	0.1-20	0.97-0.996	This work

Table 2.

Parameters used for modelling the systems studied in this work with PR and PC-SAFT EoS.

Pure compound parameter	CO ₂	CH ₄	CO
T_c / K	304.21 ^a	190.56 ^b	132.86 ^b
P_c / MPa	7.383 ^a	4.599 ^b	3.494 ^b
ω	0.224 ^b	0.011 ^b	0.066 ^b
m	2.0730 ^c / 2.1276 ^d	1.0000 ^c / 1.0039 ^e	1.3097 ^c / 1.3063 ^e
$\sigma / \text{\AA}$	2.7852 ^c / 2.8251 ^d	3.7039 ^c / 3.7126 ^e	3.2507 ^c / 3.2565 ^e
ε / K	169.21 ^c / 163.76 ^d	150.03 ^c / 149.11 ^e	92.15 ^c / 91.48 ^e
$\Delta v_c / 10^{-3} \text{m}^3 \text{kg}^{-1}$	0.02 ^f / 0.17 ^d	---	-0.1 ^f / -0.1 ^e

Used in PR and PC-SAFT EoS: T_c , critical temperature; P_c , critical pressure; ω , acentric factor.
Used in PC-SAFT EoS: m , segment number; σ , segment diameter; ε , segment energy parameter; Δv_c , volume shift.

Binary Interaction parameter, k_{ij}	CO ₂ +CH ₄	CO ₂ +CO
Peng-Robinson EoS	0.12 ^b	-0.155 ^g
PC-SAFT EoS	0.07 ^f / 0.05 ^e	0.12 ^f / 0 ^e

^a Gil et al., 2008.^b Laursen, 2012.^c PC-SAFT original model; Gross and Sadowski, 2001.^d PC-SAFT rescaled model; Blanco et al., 2009.^e PC-SAFT rescaled model; this work.^f PC-SAFT original model; this work.^g Ke et al., 2001.

Table 3.

Comparison between the experimental $P - \rho - T - x_{\text{CO}_2}$ data for the systems studied in this work and those calculated using PR, PC-SAFT and GERG EoS.

	$MRD_\rho / (\%)$ $T = 304.21 \text{ K}$			$MRD_\rho^a / (\%)$ $T = 308.15 \text{ K}$		
	PR	PC-SAFT	GERG	PR	PC-SAFT	GERG
CO₂ + CH₄						
$x_{\text{CO}_2} = 0.9719$	3.4	1.4 ^b /2.6 ^c	0.5	3.4	1.4 ^b /2.6 ^c	0.4
$x_{\text{CO}_2} = 0.9809$	3.2	1.8 ^b /2.7 ^c	0.2	3.6	1.7 ^b /2.9 ^c	0.4
$x_{\text{CO}_2} = 0.9902$	3.4	1.7 ^b /2.8 ^c	0.4	3.6	2.0 ^b /3.0 ^c	0.3
$x_{\text{CO}_2} = 0.9932$	3.4	1.9 ^b /2.8 ^c	0.5	3.8	1.7 ^b /3.0 ^c	0.4
$x_{\text{CO}_2} = 0.9961$	3.4	1.8 ^b /2.8 ^c	0.3	3.8	1.7 ^b /2.8 ^c	0.4
$\overline{MRD}_\rho / (\%)$	3.4	1.7 ^b /2.7 ^c	0.4	3.7	1.7 ^b /2.9 ^c	0.4
	$MRD_\rho / (\%)$ $T = 304.21 \text{ K}$			$MRD_\rho / (\%)$ $T = 308.15 \text{ K}$		
	PR	PC-SAFT	GERG	PR	PC-SAFT	GERG
CO₂ + CO						
$x_{\text{CO}_2} = 0.9700$	2.8	1.5 ^b /2.6 ^c	1.8	3.1	1.3 ^b /2.4 ^c	1.5
$x_{\text{CO}_2} = 0.9810$	3.1	1.4 ^b /2.7 ^c	1.4	3.4	1.2 ^b /2.6 ^c	1.6
$x_{\text{CO}_2} = 0.9902$	3.4	1.4 ^b /2.8 ^c	1.1	3.4	1.4 ^b /2.7 ^c	0.7
$x_{\text{CO}_2} = 0.9930$	3.2	1.6 ^b /2.7 ^c	0.7	3.7	1.4 ^b /2.9 ^c	0.8
$x_{\text{CO}_2} = 0.9960$	3.4	1.7 ^b /2.7 ^c	0.8	3.6	1.5 ^b /2.8 ^c	0.7
$\overline{MRD}_\rho / (\%)$	3.2	1.5 ^b /2.7 ^c	1.1	3.4	1.4 ^b /2.7 ^c	1.1

^a Experimental data from Blanco et al., 2012.

^b PC-SAFT original model.

^c PC-SAFT rescaled model.

Table 4.

Comparison between the values obtained for the CO₂ + CH₄ and CO₂ + CO systems for several structural parameters and properties: Krichevskii parameter, A_{Kr} ; reduced Krichevskii parameter, A_{Kr}^* ; maximum value of the partial molar volume of solute at infinite dilution at $T = 308.15$ K, $(\bar{V}_2^\infty)_{max}$; minimum value of the excess solvent number at $T = 308.15$ K, $(N_{exc}^\infty)_{min}$; cluster size at $T = 308.15$ K, $(N_1^{exc})_{max}$, and direct correlation function integrals, C_{ij} at $\rho = \rho_c(\text{CO}_2)$ and $T = 308.15$ K.

Parameter/Property	T / K	System	
		CO ₂ + CH ₄	CO ₂ + CO
A_{Kr} / MPa	304.21	20.383 ± 0.004	26.418 ± 0.005
A_{Kr}^*	304.21	0.76	0.98
$(\bar{V}_2^\infty)_{max}$ / cm ³ .mol ⁻¹	308.15	3300	3950
$(N_{exc}^\infty)_{min}$	308.15	-33	-38
$(N_1^{exc})_{max}$	308.15	11	3
$10^{-3}(C_{12})_{\rho_c}$ / cm ³ .mol ⁻¹	308.15	0.020	0.006
$10^{-3}(C_{11} - C_{12})_{\rho_c}$ / cm ³ .mol ⁻¹	308.15	0.072	0.085

Table 5.

Equation overview for the calculation of several parameters in pipeline design and operation (ElementEnergy 2010).

Parameter	Formula	Symbols
Mass flow	$m = \rho \times v \times A$	m = mass flow (kg/s); ρ = fluid density (kg/m ³); v = fluid velocity (m/s); A = pipeline inner section (m ²).
Pipeline inner diameter sizing	$D = \left(\frac{4 \times m}{v \times \pi \times \rho} \right)^{1/2}$	D = inner diameter (m); m = mass flow (kg/s); v = fluid velocity (m/s); ρ = fluid density (kg/m ³).
Erosional velocity	$v_E = \frac{C}{\sqrt{\rho}}$	v_E = erosional velocity (m/s); C = empirical constant ; ρ = fluid density (kg/m ³).
Reynolds number	$Re = \frac{\rho \times v \times D}{\mu}$	Re = Reynolds number; ρ = fluid density (kg/m ³); v = fluid velocity (m/s); D = inner diameter (m); μ = fluid viscosity (Pa.s).
Capacity of the booster stations	$W = \frac{m}{\rho} \times \frac{(P_{out} - P_{in})}{\eta_{booster}}$	W = capacity of the booster station (MW); m = mass flow (kg/s); ρ = fluid density (kg/m ³); P_{out} = booster outlet pressure (MPa); P_{in} = booster inlet pressure (MPa); $\eta_{booster}$ = booster efficiency.
Darcy-Weisbach friction factor	$f = \frac{1.325}{\left[\ln \left[\frac{e}{3.7 \times D} + \frac{5.74}{Re^{0.9}} \right] \right]^2}$	f = Darcy-Weisbach friction factor; e = roughness height (m); D = inner diameter (m); Re = Reynolds number.
Pressure drop per metre	$\frac{\Delta P}{L} = \frac{8 \times f \times m^2}{\rho \times \pi^2 \times D^5}$	$(\Delta P/L)$ = pressure drop per metre (Pa/m); m = mass flow (kg/s); ρ = fluid density (kg/m ³); f = Darcy-Weisbach friction factor; D = inner diameter (m).

Influence of methane and carbon monoxide in the volumetric behavior of the anthropogenic CO₂. Experimental data and modelling in the critical region.

Clara Rivas, Sofía Blanco, Javier Fernández, Manuela Artal, Inmaculada Velasco*

*Departamento de Química Física, Facultad de Ciencias, Universidad de Zaragoza,
50009 – Zaragoza, Spain*

*Corresponding author: curra@unizar.es

SUPPORTING INFORMATION

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TABLE S1. Experimental densities of { x CO₂ + (1- x) CH₄ } binary mixtures at $T = 304.21$ K

$x = 0.9719$		$x = 0.9809$		$x = 0.9902$		$x = 0.9932$		$x = 0.9961$	
P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$
20.250	852.98	20.118	861.85	20.078	874.08	20.082	876.87	20.125	881.30
20.230	853.06	20.098	861.73	20.058	873.92	20.062	876.72	20.105	881.14
20.209	853.06	20.078	861.56	20.038	873.79	20.042	876.60	20.085	881.06
20.189	852.98	20.058	861.37	20.018	873.68	20.022	876.47	20.065	880.98
20.169	852.82	20.038	861.23	19.998	873.51	20.002	876.30	20.045	880.81
20.149	852.70	20.018	861.03	19.978	873.35	19.982	876.15	20.025	880.66
20.129	852.57	19.998	860.87	19.958	873.16	19.962	875.98	20.005	880.60
20.109	852.41	19.978	860.74	19.938	873.02	19.942	875.88	19.985	880.41
20.088	852.29	19.958	860.59	19.918	872.86	19.922	875.73	19.965	880.30
20.068	852.09	19.938	860.40	19.898	872.64	19.902	875.57	19.945	880.18
20.048	852.00	19.918	860.22	19.878	872.53	19.882	875.41	19.925	880.03
20.028	851.84	19.898	860.14	19.858	872.37	19.862	875.24	19.905	879.91
20.008	851.69	19.878	859.94	19.838	872.21	19.842	875.10	19.885	879.76
19.988	851.57	19.858	859.84	19.818	872.04	19.822	875.00	19.865	879.67
19.967	851.36	19.838	859.71	19.798	871.95	19.802	874.84	19.845	879.49
19.947	851.19	19.818	859.55	19.778	871.82	19.782	874.67	19.825	879.36
19.927	851.11	19.798	859.37	19.758	871.66	19.762	874.51	19.805	879.23
19.907	850.93	19.778	859.24	19.738	871.50	19.742	874.35	19.785	879.09
19.887	850.79	19.758	859.05	19.718	871.35	19.722	874.18	19.765	878.96
19.867	850.62	19.738	858.89	19.698	871.24	19.702	874.10	19.745	878.83
19.846	850.46	19.718	858.73	19.678	871.07	19.682	873.96	19.725	878.66
19.826	850.27	19.698	858.53	19.658	870.93	19.662	873.78	19.705	878.48
19.806	850.16	19.678	858.37	19.638	870.79	19.642	873.59	19.685	878.38
19.786	849.97	19.658	858.21	19.618	870.66	19.622	873.47	19.665	878.23
19.766	849.80	19.638	858.05	19.598	870.48	19.602	873.34	19.645	878.09
19.746	849.64	19.618	857.93	19.578	870.35	19.582	873.12	19.625	877.96
19.725	849.46	19.598	857.74	19.558	870.23	19.562	873.00	19.605	877.84
19.705	849.27	19.578	857.62	19.538	870.07	19.542	872.83	19.585	877.70
19.685	849.15	19.558	857.46	19.518	869.89	19.522	872.70	19.565	877.52

19.665	848.91	19.538	857.32	19.498	869.76	19.502	872.55	19.545	877.37
19.645	848.74	19.518	857.15	19.478	869.63	19.482	872.39	19.525	877.24
19.625	848.58	19.498	857.03	19.458	869.41	19.462	872.23	19.505	877.07
19.604	848.44	19.478	856.86	19.438	869.28	19.442	872.02	19.485	876.93
19.584	848.25	19.458	856.70	19.418	869.15	19.422	871.90	19.465	876.82
19.564	848.09	19.438	856.53	19.398	869.01	19.402	871.72	19.445	876.69
19.544	847.93	19.418	856.36	19.378	868.80	19.382	871.57	19.425	876.51
19.524	847.74	19.398	856.22	19.358	868.70	19.362	871.41	19.405	876.32
19.504	847.60	19.378	856.07	19.338	868.52	19.342	871.25	19.385	876.16
19.483	847.42	19.358	855.89	19.318	868.38	19.322	871.08	19.365	876.01
19.463	847.23	19.338	855.69	19.298	868.25	19.302	870.93	19.345	875.86
19.443	847.11	19.318	855.53	19.278	868.12	19.282	870.76	19.325	875.76
19.423	846.95	19.298	855.35	19.258	867.95	19.262	870.60	19.305	875.59
19.403	846.78	19.278	855.18	19.238	867.76	19.242	870.44	19.285	875.46
19.383	846.58	19.258	855.00	19.218	867.63	19.222	870.33	19.265	875.29
19.362	846.46	19.238	854.83	19.198	867.49	19.202	870.12	19.245	875.15
19.342	846.30	19.218	854.71	19.178	867.27	19.182	869.99	19.225	875.00
19.322	846.12	19.198	854.51	19.158	867.13	19.162	869.84	19.205	874.84
19.302	845.90	19.178	854.34	19.138	867.00	19.142	869.73	19.185	874.71
19.282	845.79	19.158	854.10	19.118	866.87	19.122	869.54	19.165	874.55
19.261	845.60	19.138	853.94	19.098	866.68	19.102	869.37	19.145	874.36
19.241	845.40	19.118	853.77	19.078	866.51	19.082	869.21	19.125	874.17
19.221	845.24	19.098	853.54	19.058	866.36	19.062	869.08	19.105	874.05
19.201	845.08	19.078	853.40	19.038	866.22	19.042	868.94	19.085	873.94
19.181	844.91	19.058	853.23	19.018	866.08	19.022	868.76	19.065	873.79
19.161	844.75	19.038	853.09	18.998	865.88	19.002	868.64	19.045	873.60
19.140	844.50	19.018	852.90	18.978	865.72	18.982	868.39	19.025	873.44
19.120	844.33	18.998	852.72	18.958	865.58	18.962	868.31	19.005	873.29
19.100	844.14	18.978	852.54	18.938	865.36	18.942	868.15	18.984	873.13
19.080	844.02	18.958	852.39	18.918	865.22	18.922	867.95	18.964	872.93
19.060	843.79	18.938	852.20	18.898	865.08	18.902	867.82	18.944	872.77
19.040	843.61	18.918	852.09	18.878	864.94	18.882	867.62	18.924	872.62
19.019	843.44	18.898	851.88	18.858	864.81	18.862	867.50	18.904	872.47

18.999	843.28	18.878	851.74	18.838	864.59	18.842	867.33	18.884	872.34
18.979	843.07	18.858	851.50	18.818	864.44	18.822	867.17	18.864	872.15
18.959	842.87	18.838	851.36	18.798	864.29	18.802	866.98	18.844	871.98
18.939	842.71	18.818	851.21	18.778	864.13	18.782	866.85	18.824	871.83
18.919	842.54	18.798	851.00	18.758	863.90	18.762	866.66	18.804	871.69
18.898	842.36	18.778	850.81	18.738	863.78	18.742	866.50	18.784	871.53
18.878	842.15	18.758	850.62	18.718	863.59	18.722	866.34	18.764	871.38
18.858	841.98	18.738	850.44	18.698	863.44	18.702	866.15	18.744	871.21
18.838	841.81	18.718	850.24	18.678	863.28	18.682	865.95	18.724	871.10
18.818	841.67	18.698	850.07	18.658	863.12	18.662	865.86	18.704	870.91
18.798	841.50	18.678	849.84	18.638	862.94	18.642	865.63	18.684	870.75
18.777	841.32	18.658	849.65	18.618	862.75	18.622	865.48	18.664	870.59
18.757	841.14	18.638	849.45	18.598	862.57	18.602	865.31	18.644	870.43
18.737	840.98	18.618	849.29	18.578	862.42	18.582	865.16	18.624	870.26
18.717	840.84	18.598	849.13	18.558	862.26	18.562	864.97	18.604	870.07
18.697	840.63	18.578	848.93	18.538	862.11	18.542	864.80	18.584	869.88
18.677	840.46	18.558	848.78	18.518	861.95	18.522	864.64	18.564	869.73
18.656	840.33	18.538	848.63	18.498	861.78	18.502	864.48	18.544	869.57
18.636	840.12	18.518	848.46	18.478	861.55	18.482	864.29	18.524	869.41
18.616	839.95	18.498	848.27	18.458	861.40	18.462	864.14	18.504	869.27
18.596	839.69	18.478	848.07	18.438	861.24	18.442	863.99	18.484	869.10
18.576	839.55	18.458	847.90	18.419	861.08	18.422	863.76	18.464	868.88
18.556	839.37	18.438	847.74	18.399	860.92	18.402	863.60	18.444	868.70
18.535	839.20	18.418	847.49	18.379	860.71	18.382	863.42	18.424	868.54
18.515	838.96	18.398	847.33	18.359	860.52	18.362	863.25	18.404	868.39
18.495	838.84	18.378	847.24	18.339	860.37	18.342	863.09	18.384	868.21
18.475	838.60	18.358	847.09	18.319	860.22	18.322	862.94	18.364	868.07
18.455	838.42	18.338	846.90	18.299	860.06	18.302	862.76	18.344	867.92
18.435	838.23	18.318	846.76	18.279	859.89	18.282	862.57	18.324	867.79
18.414	837.99	18.298	846.52	18.259	859.74	18.262	862.41	18.304	867.62
18.394	837.82	18.278	846.37	18.239	859.49	18.242	862.28	18.284	867.45
18.374	837.66	18.258	846.19	18.219	859.33	18.222	862.07	18.264	867.26
18.354	837.47	18.238	846.06	18.199	859.17	18.202	861.88	18.244	867.03

18.334	837.25	18.218	845.91	18.179	859.01	18.182	861.70	18.224	866.92
18.314	837.09	18.198	845.76	18.159	858.83	18.162	861.53	18.204	866.77
18.293	836.91	18.178	845.59	18.139	858.67	18.142	861.38	18.184	866.59
18.273	836.68	18.158	845.40	18.119	858.49	18.122	861.18	18.164	866.41
18.253	836.52	18.138	845.20	18.099	858.34	18.102	861.05	18.144	866.26
18.233	836.34	18.118	845.05	18.079	858.16	18.082	860.81	18.124	866.10
18.213	836.22	18.098	844.90	18.059	857.91	18.062	860.71	18.104	865.93
18.193	835.94	18.078	844.73	18.039	857.75	18.042	860.48	18.084	865.74
18.172	835.91	18.058	844.59	18.019	857.58	18.022	860.32	18.064	865.54
18.152	835.73	18.038	844.41	17.999	857.41	18.002	860.15	18.044	865.31
18.132	835.56	18.018	844.21	17.979	857.24	17.982	860.00	18.024	865.20
18.112	835.40	17.998	844.08	17.959	857.06	17.962	859.84	18.004	865.04
18.092	835.19	17.978	843.90	17.939	856.89	17.942	859.70	17.984	864.86
18.072	835.03	17.958	843.72	17.919	856.71	17.922	859.52	17.964	864.69
18.051	834.97	17.938	843.59	17.899	856.46	17.902	859.35	17.944	864.47
18.031	834.80	17.918	843.43	17.879	856.30	17.882	859.16	17.924	864.30
18.011	834.61	17.898	843.21	17.859	856.14	17.862	859.03	17.904	864.12
17.991	834.41	17.878	843.01	17.839	855.97	17.842	858.85	17.884	863.95
17.971	834.21	17.858	842.87	17.819	855.77	17.822	858.66	17.864	863.79
17.951	834.05	17.838	842.67	17.799	855.60	17.802	858.45	17.844	863.66
17.930	833.88	17.818	842.45	17.779	855.41	17.782	858.34	17.824	863.48
17.910	833.71	17.797	842.35	17.759	855.25	17.762	858.14	17.804	863.26
17.890	833.53	17.777	842.21	17.739	855.08	17.742	857.98	17.784	863.13
17.870	833.36	17.757	842.04	17.719	854.92	17.722	857.81	17.764	862.91
17.850	833.19	17.737	841.83	17.699	854.73	17.702	857.62	17.744	862.72
17.830	833.03	17.717	841.62	17.679	854.56	17.682	857.42	17.723	862.61
17.809	832.85	17.697	841.50	17.659	854.30	17.662	857.30	17.703	862.39
17.789	832.68	17.677	841.26	17.639	854.18	17.642	857.12	17.683	862.20
17.769	832.52	17.657	841.07	17.619	853.93	17.622	856.92	17.663	862.08
17.749	832.37	17.637	840.95	17.599	853.77	17.602	856.73	17.643	861.87
17.729	832.19	17.617	840.72	17.579	853.66	17.582	856.61	17.623	861.72
17.709	832.02	17.597	840.48	17.559	853.49	17.562	856.41	17.603	861.52
17.688	831.83	17.577	840.36	17.539	853.25	17.542	856.19	17.583	861.34

17.668	831.64	17.557	840.18	17.519	853.06	17.522	856.04	17.563	861.16
17.648	831.44	17.537	839.97	17.499	852.88	17.502	855.86	17.543	860.97
17.628	831.24	17.517	839.83	17.479	852.71	17.482	855.66	17.523	860.78
17.608	831.08	17.497	839.64	17.459	852.52	17.462	855.51	17.503	860.60
17.588	830.93	17.477	839.45	17.439	852.30	17.442	855.31	17.483	860.45
17.567	830.76	17.457	839.30	17.419	852.13	17.422	855.18	17.463	860.19
17.547	830.58	17.437	839.10	17.399	851.97	17.402	854.97	17.443	860.07
17.527	830.40	17.417	838.93	17.379	851.78	17.382	854.76	17.423	859.90
17.507	830.21	17.397	838.70	17.359	851.59	17.362	854.56	17.403	859.73
17.487	830.02	17.377	838.52	17.339	851.42	17.342	854.42	17.383	859.56
17.467	829.79	17.357	838.32	17.319	851.14	17.322	854.21	17.363	859.32
17.446	829.57	17.337	838.13	17.299	851.00	17.302	854.03	17.343	859.15
17.426	829.42	17.317	837.97	17.279	850.87	17.282	853.86	17.323	858.96
17.406	829.29	17.297	837.76	17.259	850.66	17.262	853.65	17.303	858.80
17.386	829.13	17.277	837.56	17.239	850.41	17.242	853.51	17.283	858.62
17.366	828.91	17.257	837.31	17.219	850.27	17.222	853.28	17.263	858.48
17.346	828.69	17.237	837.14	17.199	850.03	17.202	853.15	17.243	858.29
17.325	828.53	17.217	836.99	17.179	849.87	17.182	852.95	17.223	858.07
17.305	828.33	17.197	836.77	17.159	849.67	17.162	852.76	17.203	857.86
17.285	828.12	17.177	836.60	17.139	849.49	17.142	852.55	17.183	857.70
17.265	827.88	17.157	836.41	17.119	849.30	17.122	852.41	17.163	857.50
17.245	827.70	17.137	836.18	17.099	849.11	17.102	852.19	17.143	857.31
17.225	827.56	17.117	836.01	17.079	848.92	17.082	851.99	17.123	857.15
17.204	827.38	17.097	835.86	17.059	848.72	17.062	851.83	17.103	856.94
17.184	827.15	17.077	835.69	17.039	848.52	17.042	851.59	17.083	856.74
17.164	826.94	17.057	835.45	17.019	848.33	17.022	851.46	17.063	856.57
17.144	826.78	17.037	835.29	16.999	848.12	17.002	851.23	17.043	856.42
17.124	826.62	17.017	835.11	16.979	847.98	16.982	851.02	17.023	856.20
17.104	826.38	16.997	834.89	16.959	847.82	16.962	850.84	17.003	856.03
17.083	826.15	16.977	834.69	16.939	847.63	16.942	850.69	16.983	855.84
17.063	825.94	16.957	834.49	16.919	847.43	16.922	850.45	16.963	855.65
17.043	825.77	16.937	834.30	16.899	847.24	16.902	850.29	16.943	855.49
17.023	825.53	16.917	834.10	16.879	847.00	16.882	850.07	16.923	855.28

17.003	825.38	16.897	833.87	16.859	846.81	16.862	849.93	16.903	855.06
16.983	825.19	16.877	833.60	16.839	846.68	16.842	849.70	16.883	854.90
16.962	824.99	16.857	833.47	16.819	846.48	16.822	849.47	16.863	854.69
16.942	824.82	16.837	833.22	16.799	846.23	16.802	849.30	16.843	854.47
16.922	824.61	16.817	832.97	16.779	846.02	16.782	849.15	16.823	854.30
16.902	824.39	16.797	832.77	16.759	845.82	16.762	848.92	16.803	854.12
16.882	824.18	16.777	832.58	16.739	845.71	16.742	848.77	16.783	853.98
16.862	823.97	16.757	832.33	16.719	845.50	16.722	848.55	16.763	853.75
16.841	823.78	16.737	832.14	16.699	845.30	16.702	848.34	16.743	853.61
16.821	823.60	16.717	831.99	16.679	845.12	16.682	848.17	16.723	853.39
16.801	823.41	16.697	831.78	16.659	844.91	16.662	848.00	16.703	853.17
16.781	823.18	16.677	831.56	16.639	844.71	16.642	847.77	16.683	852.93
16.761	822.93	16.657	831.35	16.619	844.51	16.622	847.61	16.663	852.76
16.741	822.72	16.637	831.12	16.599	844.36	16.602	847.37	16.643	852.57
16.720	822.56	16.617	830.94	16.579	844.15	16.582	847.21	16.623	852.39
16.700	822.41	16.597	830.73	16.559	843.99	16.562	846.97	16.603	852.20
16.680	822.20	16.577	830.48	16.539	843.78	16.542	846.82	16.583	852.04
16.660	821.99	16.557	830.27	16.519	843.59	16.522	846.59	16.563	851.81
16.640	821.76	16.537	830.07	16.499	843.39	16.502	846.40	16.543	851.60
16.620	821.57	16.517	829.88	16.479	843.19	16.482	846.20	16.523	851.46
16.599	821.33	16.497	829.72	16.459	842.99	16.462	845.98	16.503	851.24
16.579	821.17	16.477	829.47	16.439	842.77	16.442	845.80	16.483	850.99
16.559	820.98	16.457	829.24	16.419	842.60	16.422	845.61	16.462	850.83
16.539	820.67	16.437	829.05	16.399	842.45	16.402	845.43	16.442	850.62
16.519	820.49	16.417	828.84	16.379	842.24	16.382	845.23	16.422	850.44
16.499	820.28	16.397	828.61	16.359	842.03	16.362	845.02	16.402	850.24
16.478	820.08	16.377	828.40	16.339	841.81	16.342	844.81	16.382	850.05
16.458	819.90	16.357	828.21	16.319	841.62	16.322	844.59	16.362	849.83
16.438	819.71	16.337	827.97	16.299	841.46	16.302	844.40	16.342	849.59
16.418	819.50	16.317	827.77	16.279	841.25	16.282	844.20	16.322	849.46
16.398	819.27	16.297	827.55	16.259	841.04	16.262	844.00	16.302	849.26
16.378	819.03	16.277	827.36	16.239	840.83	16.242	843.76	16.282	849.06
16.357	818.82	16.257	827.13	16.219	840.62	16.222	843.59	16.262	848.80

16.337	818.61	16.237	826.92	16.199	840.49	16.202	843.43	16.242	848.66
16.317	818.33	16.217	826.75	16.179	840.28	16.182	843.25	16.222	848.42
16.297	818.17	16.197	826.53	16.159	840.06	16.162	843.04	16.202	848.25
16.277	818.00	16.177	826.34	16.139	839.85	16.142	842.83	16.182	848.02
16.257	817.77	16.157	826.09	16.119	839.64	16.122	842.61	16.162	847.79
16.236	817.55	16.137	825.88	16.099	839.50	16.102	842.45	16.142	847.62
16.216	817.33	16.117	825.69	16.080	839.21	16.082	842.26	16.122	847.44
16.196	817.10	16.097	825.47	16.060	839.08	16.062	842.03	16.102	847.19
16.176	816.87	16.077	825.21	16.040	838.87	16.042	841.81	16.082	847.04
16.156	816.68	16.057	825.01	16.020	838.67	16.022	841.61	16.062	846.83
16.136	816.41	16.037	824.81	16.000	838.45	16.002	841.43	16.042	846.64
16.115	816.13	16.017	824.58	15.980	838.23	15.982	841.22	16.022	846.42
16.095	815.96	15.997	824.35	15.960	838.03	15.962	841.06	16.002	846.22
16.075	815.76	15.977	824.13	15.940	837.87	15.942	840.83	15.982	845.99
16.055	815.54	15.957	823.88	15.920	837.64	15.922	840.62	15.962	845.78
16.035	815.38	15.937	823.73	15.900	837.41	15.902	840.41	15.942	845.62
16.015	815.13	15.917	823.44	15.880	837.24	15.882	840.20	15.922	845.41
15.994	814.87	15.897	823.27	15.860	837.01	15.862	839.96	15.902	845.20
15.974	814.66	15.877	822.87	15.840	836.77	15.842	839.76	15.882	845.00
15.954	814.45	15.857	822.63	15.820	836.63	15.822	839.57	15.862	844.77
15.934	814.20	15.837	822.38	15.800	836.40	15.802	839.32	15.842	844.60
15.914	813.99	15.817	822.14	15.780	836.17	15.782	839.16	15.822	844.39
15.894	813.76	15.797	821.92	15.760	835.95	15.762	838.92	15.802	844.17
15.873	813.51	15.777	821.65	15.740	835.74	15.742	838.71	15.782	843.94
15.853	813.30	15.757	821.40	15.720	835.50	15.722	838.51	15.762	843.76
15.833	813.06	15.737	821.07	15.700	835.33	15.702	838.35	15.742	843.55
15.813	812.78	15.717	820.83	15.680	835.08	15.682	838.05	15.722	843.34
15.793	812.63	15.697	820.52	15.660	834.93	15.662	837.88	15.702	843.16
15.773	812.42	15.677	820.34	15.640	834.69	15.642	837.68	15.682	842.91
15.752	812.16	15.657	820.01	15.620	834.44	15.622	837.44	15.662	842.73
15.732	811.94	15.637	819.65	15.600	834.20	15.602	837.22	15.642	842.47
15.712	811.72	15.617	819.49	15.580	834.02	15.582	836.99	15.622	842.30
15.692	811.49	15.597	819.36	15.560	833.78	15.562	836.77	15.602	842.10

15.672	811.23	15.577	819.20	15.540	833.61	15.542	836.58	15.582	841.86
15.652	810.98	15.557	819.03	15.520	833.37	15.522	836.37	15.562	841.65
15.631	810.75	15.537	818.79	15.500	833.13	15.502	836.13	15.542	841.43
15.611	810.54	15.517	818.57	15.480	832.96	15.482	835.96	15.522	841.19
15.591	810.32	15.497	818.41	15.460	832.71	15.462	835.73	15.502	841.00
15.571	809.98	15.477	818.17	15.440	832.07	15.442	835.51	15.482	840.83
15.551	809.77	15.457	817.99	15.420	832.08	15.422	835.28	15.462	840.56
15.531	809.57	15.437	817.73	15.400	831.54	15.402	835.11	15.442	840.38
15.510	809.28	15.417	817.56	15.380	831.37	15.382	834.82	15.422	840.11
15.490	809.07	15.397	817.34	15.360	831.21	15.362	834.65	15.402	839.95
15.470	808.78	15.377	817.09	15.340	830.96	15.342	834.40	15.382	839.74
15.450	808.56	15.357	816.92	15.320	830.78	15.322	834.21	15.362	839.48
15.430	808.33	15.337	816.68	15.300	830.58	15.302	833.97	15.342	839.30
15.410	808.04	15.317	816.49	15.280	830.38	15.282	833.73	15.322	839.02
15.389	807.84	15.297	816.25	15.260	830.17	15.262	833.48	15.302	838.86
15.369	807.63	15.277	816.02	15.240	829.97	15.242	833.32	15.282	838.67
15.349	807.34	15.257	815.80	15.220	829.75	15.222	833.08	15.262	838.47
15.329	807.10	15.236	815.61	15.200	829.52	15.202	832.83	15.242	838.21
15.309	806.90	15.216	815.35	15.180	829.29	15.182	832.63	15.222	838.00
15.289	806.65	15.196	815.10	15.160	829.05	15.162	832.43	15.201	837.75
15.268	806.39	15.176	814.87	15.140	828.84	15.142	832.19	15.181	837.56
15.248	806.16	15.156	814.63	15.120	828.65	15.122	831.95	15.161	837.28
15.228	805.91	15.136	814.50	15.100	828.43	15.102	831.71	15.141	837.07
15.208	805.65	15.116	814.33	15.080	828.21	15.082	831.47	15.121	836.87
15.188	805.44	15.096	814.05	15.060	827.95	15.062	831.30	15.101	836.69
15.168	805.19	15.076	813.80	15.040	827.72	15.042	831.05	15.081	836.41
15.147	804.93	15.056	813.59	15.020	827.45	15.022	830.81	15.061	836.23
15.127	804.73	15.036	813.41	15.000	827.20	15.002	830.62	15.041	836.00
15.107	804.42	15.016	813.17	14.980	827.00	14.982	830.38	15.021	835.76
15.087	804.22	14.996	812.93	14.960	826.79	14.962	830.12	15.001	835.56
15.067	803.99	14.976	812.74	14.940	826.49	14.942	829.86	14.981	835.28
15.047	803.68	14.956	812.48	14.920	826.29	14.922	829.67	14.961	835.08
15.026	803.47	14.936	812.27	14.900	826.03	14.902	829.48	14.941	834.80

15.006	803.25	14.916	811.96	14.880	825.79	14.882	829.21	14.921	834.63
14.986	802.93	14.896	811.70	14.860	825.55	14.862	828.98	14.901	834.38
14.966	802.72	14.876	811.53	14.840	825.30	14.842	828.73	14.881	834.19
14.946	802.45	14.856	811.26	14.820	825.08	14.822	828.58	14.861	833.90
14.926	802.17	14.836	810.99	14.800	824.84	14.802	828.33	14.841	833.69
14.905	801.95	14.816	810.79	14.780	824.61	14.782	828.08	14.821	833.48
14.885	801.68	14.796	810.55	14.760	824.33	14.762	827.82	14.801	833.28
14.865	801.42	14.776	810.31	14.740	824.12	14.742	827.61	14.781	833.05
14.845	801.20	14.756	810.01	14.720	823.82	14.722	827.35	14.761	832.84
14.825	800.96	14.736	809.74	14.700	823.58	14.702	827.14	14.741	832.60
14.805	800.74	14.716	809.51	14.680	823.34	14.682	826.86	14.721	832.32
14.784	800.43	14.696	809.27	14.660	823.10	14.662	826.67	14.701	832.12
14.764	800.17	14.676	809.01	14.640	822.85	14.642	826.41	14.681	831.90
14.744	799.88	14.656	808.72	14.620	822.56	14.622	826.14	14.661	831.61
14.724	799.62	14.636	808.49	14.600	822.32	14.602	825.92	14.641	831.40
14.704	799.38	14.616	808.18	14.580	822.12	14.582	825.72	14.621	831.20
14.684	799.12	14.596	807.92	14.560	821.86	14.562	825.46	14.601	830.91
14.663	798.86	14.576	807.67	14.540	821.57	14.542	825.19	14.581	830.70
14.643	798.62	14.556	807.47	14.520	821.36	14.522	825.02	14.561	830.48
14.623	798.32	14.536	807.33	14.500	821.11	14.502	824.75	14.541	830.25
14.603	798.04	14.516	807.10	14.480	820.81	14.482	824.48	14.521	830.03
14.583	797.78	14.496	806.83	14.460	820.57	14.462	824.26	14.501	829.72
14.563	797.47	14.476	806.56	14.440	820.32	14.442	824.03	14.481	829.58
14.542	797.27	14.456	806.27	14.420	820.10	14.422	823.76	14.461	829.28
14.522	797.00	14.436	806.12	14.400	819.83	14.402	823.56	14.441	829.05
14.502	796.71	14.416	805.88	14.380	819.59	14.382	823.29	14.421	828.82
14.482	796.47	14.396	805.61	14.360	819.39	14.362	823.00	14.401	828.59
14.462	796.23	14.376	805.36	14.340	819.10	14.342	822.82	14.381	828.31
14.441	795.90	14.356	805.17	14.320	818.85	14.322	822.54	14.361	828.12
14.421	795.63	14.336	804.98	14.300	818.64	14.302	822.30	14.341	827.82
14.401	795.44	14.316	804.75	14.280	818.37	14.282	822.09	14.321	827.59
14.381	795.12	14.296	804.48	14.260	818.13	14.262	821.81	14.301	827.34
14.361	794.83	14.276	804.26	14.240	817.88	14.242	821.54	14.281	827.09

14.341	794.56	14.256	803.98	14.220	817.68	14.222	821.32	14.261	826.86
14.320	794.28	14.236	803.69	14.200	817.39	14.202	821.05	14.241	826.62
14.300	793.99	14.216	803.47	14.180	817.14	14.182	820.83	14.221	826.39
14.280	793.71	14.196	803.30	14.160	816.90	14.162	820.59	14.201	826.17
14.260	793.46	14.176	803.07	14.140	816.65	14.142	820.30	14.181	825.84
14.240	793.12	14.156	802.81	14.120	816.46	14.122	820.01	14.161	825.61
14.220	792.91	14.136	802.50	14.100	816.14	14.102	819.80	14.141	825.35
14.199	792.57	14.116	802.27	14.080	815.92	14.082	819.52	14.121	825.08
14.179	792.28	14.096	802.08	14.060	815.67	14.062	819.32	14.101	824.84
14.159	792.01	14.076	801.83	14.040	815.37	14.042	819.04	14.081	824.59
14.139	791.82	14.056	801.57	14.020	815.16	14.022	818.84	14.061	824.35
14.119	791.53	14.036	801.31	14.000	814.87	14.002	818.54	14.041	824.10
14.099	791.24	14.016	800.93	13.980	814.61	13.982	818.25	14.021	823.83
14.078	790.96	13.996	800.76	13.960	814.37	13.962	818.04	14.001	823.58
14.058	790.68	13.976	800.48	13.940	814.13	13.942	817.75	13.981	823.33
14.038	790.39	13.956	800.22	13.920	813.86	13.922	817.48	13.960	823.08
14.018	790.11	13.936	799.93	13.900	813.68	13.902	817.24	13.940	822.81
13.998	789.81	13.916	799.66	13.880	813.47	13.882	816.94	13.920	822.55
13.978	789.53	13.896	799.38	13.860	813.16	13.862	816.70	13.900	822.28
13.957	789.23	13.876	799.06	13.840	812.92	13.842	816.47	13.880	821.98
13.937	788.92	13.856	798.87	13.820	812.66	13.822	816.16	13.860	821.71
13.917	788.61	13.836	798.54	13.800	812.41	13.802	815.94	13.840	821.43
13.897	788.39	13.816	798.27	13.780	812.17	13.782	815.66	13.820	821.18
13.877	788.09	13.796	798.02	13.760	811.89	13.762	815.44	13.800	820.92
13.857	787.79	13.776	797.77	13.740	811.64	13.742	815.15	13.780	820.65
13.836	787.48	13.756	797.46	13.721	811.35	13.722	814.91	13.760	820.46
13.816	787.18	13.736	797.16	13.701	811.11	13.702	814.61	13.740	820.18
13.796	786.89	13.716	796.90	13.681	810.86	13.682	814.34	13.720	819.91
13.776	786.61	13.696	796.65	13.661	810.57	13.662	814.11	13.700	819.66
13.756	786.34	13.676	796.35	13.641	810.33	13.642	813.82	13.680	819.40
13.736	786.08	13.656	796.05	13.621	810.03	13.622	813.58	13.660	819.05
13.715	785.76	13.636	795.77	13.601	809.76	13.602	813.28	13.640	818.84
13.695	785.44	13.616	795.46	13.581	809.51	13.582	813.02	13.620	818.58

13.675	785.14	13.596	795.19	13.561	809.23	13.562	812.68	13.600	818.30
13.655	784.88	13.576	794.91	13.541	808.96	13.542	812.44	13.580	818.03
13.635	784.54	13.556	794.58	13.521	808.72	13.522	812.22	13.560	817.74
13.615	784.22	13.536	794.29	13.501	808.42	13.502	811.91	13.540	817.51
13.594	783.87	13.516	793.98	13.481	808.17	13.482	811.68	13.520	817.23
13.574	783.59	13.496	793.69	13.461	807.92	13.462	811.36	13.500	816.96
13.554	783.33	13.476	793.41	13.441	807.60	13.442	811.10	13.480	816.69
13.534	783.01	13.456	793.07	13.421	807.33	13.422	810.85	13.460	816.42
13.514	782.74	13.436	792.84	13.401	807.06	13.402	810.52	13.440	816.12
13.494	782.37	13.416	792.54	13.381	806.78	13.382	810.26	13.420	815.86
13.473	782.08	13.396	792.20	13.361	806.48	13.362	810.01	13.400	815.60
13.453	781.73	13.376	791.87	13.341	806.21	13.342	809.72	13.380	815.31
13.433	781.45	13.356	791.57	13.321	805.93	13.322	809.46	13.360	815.02
13.413	781.13	13.336	791.31	13.301	805.65	13.302	809.16	13.340	814.75
13.393	780.83	13.316	790.99	13.281	805.37	13.282	808.87	13.320	814.50
13.373	780.50	13.296	790.73	13.261	805.11	13.262	808.61	13.300	814.19
13.352	780.17	13.276	790.38	13.241	804.77	13.242	808.27	13.280	813.97
13.332	779.83	13.256	790.03	13.221	804.54	13.222	808.06	13.260	813.64
13.312	779.60	13.236	789.74	13.201	804.19	13.202	807.82	13.240	813.38
13.292	779.22	13.216	789.46	13.181	803.98	13.182	807.54	13.220	813.14
13.272	778.96	13.196	789.19	13.161	803.66	13.162	807.27	13.200	812.86
13.252	778.59	13.176	788.87	13.141	803.41	13.142	807.05	13.180	812.55
13.231	778.20	13.156	788.57	13.121	803.07	13.122	806.81	13.160	812.26
13.211	777.93	13.136	788.18	13.101	802.80	13.102	806.54	13.140	812.03
13.191	777.56	13.116	787.86	13.081	802.47	13.082	806.22	13.120	811.70
13.171	777.25	13.096	787.54	13.061	802.18	13.062	805.95	13.100	811.46
13.151	776.94	13.076	787.25	13.041	801.97	13.042	805.70	13.080	811.15
13.131	776.61	13.056	786.88	13.021	801.67	13.022	805.43	13.060	810.89
13.110	776.30	13.036	786.56	13.001	801.36	13.002	805.16	13.040	810.61
13.090	775.93	13.016	786.24	12.981	801.07	12.982	804.86	13.020	810.29
13.070	775.61	12.996	785.89	12.961	800.17	12.962	804.58	13.000	810.05
13.050	775.32	12.976	785.55	12.941	799.93	12.942	804.33	12.980	809.73
13.030	774.95	12.956	785.23	12.921	799.70	12.922	804.03	12.960	809.47

13.010	774.67	12.936	784.90	12.901	799.38	12.902	803.78	12.940	809.15
12.989	774.28	12.916	784.60	12.881	799.14	12.882	803.43	12.920	808.83
12.969	773.96	12.896	784.26	12.861	798.87	12.862	803.15	12.900	808.57
12.949	773.65	12.876	783.95	12.841	798.57	12.842	802.90	12.880	808.28
12.929	773.29	12.856	783.62	12.821	798.33	12.822	802.60	12.860	807.93
12.909	772.95	12.836	783.27	12.801	798.03	12.802	802.30	12.840	807.70
12.889	772.61	12.816	782.96	12.781	797.78	12.782	802.02	12.820	807.37
12.868	772.25	12.796	782.57	12.761	797.46	12.762	801.75	12.800	807.05
12.848	771.91	12.776	782.28	12.741	797.14	12.742	801.44	12.780	806.81
12.828	771.59	12.756	781.93	12.721	796.83	12.722	801.12	12.760	806.53
12.808	771.26	12.736	781.57	12.701	796.57	12.702	800.79	12.740	806.16
12.788	770.91	12.716	781.23	12.681	796.30	12.682	800.56	12.720	805.90
12.768	770.59	12.696	780.97	12.661	795.99	12.662	800.20	12.699	805.55
12.747	770.15	12.675	780.78	12.641	795.67	12.642	799.89	12.679	805.27
12.727	769.81	12.655	780.55	12.621	795.37	12.622	799.54	12.659	804.93
12.707	769.51	12.635	780.26	12.601	795.10	12.602	799.35	12.639	804.64
12.687	769.11	12.615	779.93	12.581	794.77	12.582	799.01	12.619	804.33
12.667	768.79	12.595	779.61	12.561	794.43	12.562	798.66	12.599	804.03
12.647	768.47	12.575	779.34	12.541	794.16	12.542	798.36	12.579	803.71
12.626	768.13	12.555	778.94	12.521	793.82	12.522	798.07	12.559	803.41
12.606	767.72	12.535	778.63	12.501	793.49	12.502	797.75	12.539	803.08
12.586	767.38	12.515	778.41	12.481	793.17	12.482	797.47	12.519	802.75
12.566	767.02	12.495	778.05	12.461	792.87	12.462	797.14	12.499	802.44
12.546	766.69	12.475	777.83	12.441	792.50	12.442	796.80	12.479	802.12
12.526	766.34	12.455	777.55	12.421	792.20	12.422	796.45	12.459	801.85
12.505	766.01	12.435	777.21	12.401	791.89	12.402	796.19	12.439	801.48
12.485	765.57	12.415	776.92	12.381	791.51	12.382	795.87	12.419	801.17
12.465	765.21	12.395	776.62	12.361	791.20	12.362	795.52	12.399	800.88
12.445	764.89	12.375	776.31	12.341	790.91	12.342	795.22	12.379	800.56
12.425	764.46	12.355	775.99	12.321	790.57	12.322	794.85	12.359	800.26
12.405	764.05	12.335	775.67	12.301	790.20	12.302	794.53	12.339	799.90
12.384	763.75	12.315	775.34	12.281	789.91	12.282	794.21	12.319	799.61
12.364	763.35	12.295	775.01	12.261	789.60	12.262	793.92	12.299	799.30

12.344	762.99	12.275	774.71	12.241	789.26	12.242	793.57	12.279	798.95
12.324	762.57	12.255	774.29	12.221	788.88	12.222	793.27	12.259	798.60
12.304	762.22	12.235	773.93	12.201	788.59	12.202	792.89	12.239	798.28
12.284	761.82	12.215	773.70	12.181	788.23	12.182	792.58	12.219	797.98
12.263	761.47	12.195	773.37	12.161	787.90	12.162	792.25	12.199	797.65
12.243	761.08	12.175	772.97	12.141	787.55	12.142	791.93	12.179	797.31
12.223	760.64	12.155	772.67	12.121	787.28	12.122	791.54	12.159	796.99
12.203	760.28	12.135	772.38	12.101	786.91	12.102	791.22	12.139	796.67
12.183	759.81	12.115	772.03	12.081	786.54	12.082	790.93	12.119	796.29
12.163	759.50	12.095	771.69	12.061	786.25	12.062	790.61	12.099	795.93
12.142	759.08	12.075	771.37	12.041	785.90	12.042	790.20	12.079	795.61
12.122	758.68	12.055	771.00	12.021	785.54	12.022	789.87	12.059	795.31
12.102	758.28	12.035	770.60	12.001	785.23	12.002	789.53	12.039	794.97
12.082	757.83	12.015	770.18	11.981	784.84	11.982	789.20	12.019	794.60
12.062	757.48	11.995	769.90	11.961	784.45	11.962	788.86	11.999	794.24
12.042	756.97	11.975	769.54	11.941	784.15	11.942	788.51	11.979	793.93
12.021	756.58	11.955	769.18	11.921	783.82	11.922	788.16	11.959	793.60
12.001	756.21	11.935	768.82	11.901	783.46	11.902	787.84	11.939	793.26
11.981	755.74	11.915	768.49	11.881	783.12	11.882	787.45	11.919	792.87
11.961	755.31	11.895	768.10	11.861	782.72	11.862	787.10	11.899	792.57
11.941	754.91	11.875	767.66	11.841	782.38	11.842	786.77	11.879	792.20
11.921	754.50	11.855	767.31	11.821	782.08	11.822	786.40	11.859	791.83
11.900	754.05	11.835	766.98	11.801	781.70	11.802	786.06	11.839	791.52
11.880	753.64	11.815	766.61	11.781	781.35	11.782	785.72	11.819	791.15
11.860	753.25	11.795	766.22	11.761	780.98	11.762	785.39	11.799	790.72
11.840	752.79	11.775	765.86	11.741	780.67	11.742	785.10	11.779	789.83
11.820	752.36	11.755	765.53	11.721	780.25	11.722	784.71	11.759	789.54
11.800	751.96	11.735	765.14	11.701	779.94	11.702	784.39	11.739	789.27
11.779	751.45	11.715	764.71	11.681	779.55	11.682	783.98	11.719	789.02
11.759	751.07	11.695	764.24	11.661	779.21	11.662	783.60	11.699	788.69
11.739	750.64	11.675	763.88	11.641	778.80	11.642	783.36	11.679	788.41
11.719	750.18	11.655	763.52	11.621	778.48	11.622	782.96	11.659	788.11
11.699	749.73	11.635	763.06	11.601	778.07	11.602	782.64	11.639	787.81

11.679	749.34	11.615	762.74	11.581	777.71	11.582	782.23	11.619	787.54
11.658	748.89	11.595	762.38	11.561	777.35	11.562	781.88	11.599	787.29
11.638	748.44	11.575	762.01	11.541	776.97	11.542	781.54	11.579	786.99
11.618	747.98	11.555	761.53	11.521	776.60	11.522	781.21	11.559	786.68
11.598	747.55	11.535	761.07	11.501	776.23	11.502	780.97	11.539	786.29
11.578	747.06	11.515	760.77	11.481	775.88	11.482	780.70	11.519	786.07
11.558	746.66	11.495	760.32	11.461	775.46	11.462	780.35	11.499	785.78
11.537	746.24	11.475	759.94	11.441	775.08	11.442	780.00	11.479	785.45
11.517	745.76	11.455	759.57	11.421	774.69	11.422	779.69	11.459	785.13
11.497	745.36	11.435	759.07	11.401	774.28	11.402	779.33	11.438	784.78
11.477	744.92	11.415	758.65	11.382	773.91	11.382	778.96	11.418	784.48
11.457	744.43	11.395	758.23	11.362	773.54	11.362	778.65	11.398	784.10
11.437	743.95	11.375	757.86	11.342	773.14	11.342	778.30	11.378	783.77
11.416	743.57	11.355	757.36	11.322	772.74	11.322	777.96	11.358	783.45
11.396	743.26	11.335	756.89	11.302	772.30	11.302	777.62	11.338	783.17
11.376	742.85	11.315	756.48	11.282	771.95	11.282	777.28	11.318	782.86
11.356	742.46	11.295	756.14	11.262	771.55	11.262	776.91	11.298	782.47
11.336	742.05	11.275	755.70	11.242	771.18	11.242	776.57	11.278	782.10
11.316	741.66	11.255	755.26	11.222	770.74	11.222	776.22	11.258	781.79
11.295	741.21	11.235	754.77	11.202	770.34	11.202	775.83	11.238	781.39
11.275	740.86	11.215	754.35	11.182	769.91	11.182	775.48	11.218	781.05
11.255	740.41	11.195	753.86	11.162	769.55	11.162	775.10	11.198	780.73
11.235	740.01	11.175	753.39	11.142	769.12	11.142	774.73	11.178	780.35
11.215	739.58	11.155	753.02	11.122	768.70	11.122	774.34	11.158	780.02
11.195	739.10	11.135	752.55	11.102	768.28	11.102	774.00	11.138	779.63
11.174	738.69	11.115	752.16	11.082	767.88	11.082	773.60	11.118	779.30
11.154	738.29	11.095	751.65	11.062	767.49	11.062	773.24	11.098	778.91
11.134	737.79	11.075	751.19	11.042	767.07	11.042	772.75	11.078	778.46
11.114	737.32	11.055	750.63	11.022	766.65	11.022	772.40	11.058	778.17
11.094	736.92	11.035	750.16	11.002	766.24	11.002	772.10	11.038	777.77
11.074	736.40	11.015	749.74	10.982	765.80	10.982	771.71	11.018	777.37
11.053	735.95	10.995	749.26	10.962	765.36	10.962	771.36	10.998	777.03
11.033	735.49	10.975	748.76	10.942	764.95	10.942	770.89	10.978	776.66

11.013	734.93	10.955	748.21	10.922	764.50	10.922	770.53	10.958	776.18
10.993	734.53	10.935	747.84	10.902	764.10	10.902	770.14	10.938	775.81
10.973	733.95	10.915	747.34	10.882	763.68	10.882	769.71	10.918	775.46
10.953	733.50	10.895	746.92	10.862	762.41	10.862	769.22	10.898	775.05
10.932	733.05	10.875	746.37	10.842	762.14	10.842	768.90	10.878	774.67
10.912	732.51	10.855	745.88	10.822	761.74	10.822	768.39	10.858	774.25
10.892	731.96	10.835	745.37	10.802	761.40	10.802	768.05	10.838	773.89
10.872	731.40	10.815	744.80	10.782	761.03	10.782	767.60	10.818	773.46
10.852	730.90	10.795	744.31	10.762	760.78	10.762	767.19	10.798	773.04
10.832	730.36	10.775	743.79	10.742	760.21	10.742	766.75	10.778	772.64
10.811	729.78	10.755	743.27	10.722	759.78	10.722	766.36	10.758	772.25
10.791	729.21	10.735	742.77	10.702	759.40	10.702	765.88	10.738	771.77
10.771	728.76	10.715	742.30	10.682	758.97	10.682	765.43	10.718	771.40
10.751	728.22	10.695	741.78	10.662	758.53	10.662	765.06	10.698	770.92
10.731	727.68	10.675	741.24	10.642	758.04	10.642	764.62	10.678	770.55
10.711	727.07	10.655	740.75	10.622	757.59	10.622	764.19	10.658	770.11
10.690	726.55	10.635	740.11	10.602	757.11	10.602	763.77	10.638	769.64
10.670	726.00	10.615	739.66	10.582	756.71	10.582	763.28	10.618	769.23
10.650	725.43	10.595	739.08	10.562	756.15	10.562	762.80	10.598	768.71
10.630	724.82	10.575	738.57	10.542	755.74	10.542	762.43	10.578	768.32
10.610	724.24	10.555	738.07	10.522	755.21	10.522	762.01	10.558	767.91
10.590	723.75	10.535	737.47	10.502	754.68	10.502	761.41	10.538	767.43
10.569	723.16	10.515	736.93	10.482	754.28	10.482	760.93	10.518	767.01
10.549	722.64	10.495	736.42	10.462	753.74	10.462	760.51	10.498	766.52
10.529	722.02	10.475	735.80	10.442	753.27	10.442	759.98	10.478	766.10
10.509	721.51	10.455	735.27	10.422	752.70	10.422	759.63	10.458	765.64
10.489	720.90	10.435	734.74	10.402	752.06	10.402	759.02	10.438	765.24
10.469	720.30	10.415	734.13	10.382	751.92	10.382	758.57	10.418	764.75
10.448	719.69	10.395	733.60	10.362	751.68	10.362	758.04	10.398	764.29
10.428	719.06	10.375	733.00	10.342	751.29	10.342	757.59	10.378	763.80
10.408	718.47	10.355	732.39	10.322	750.89	10.322	757.17	10.358	763.28
10.388	717.93	10.335	731.80	10.302	750.49	10.302	756.61	10.338	762.80
10.368	717.27	10.315	731.26	10.282	750.10	10.282	756.18	10.318	762.35

10.348	716.65	10.295	730.67	10.262	749.65	10.262	755.66	10.298	761.87
10.327	716.03	10.275	730.00	10.242	749.17	10.242	755.16	10.278	761.41
10.307	715.31	10.255	729.45	10.222	748.68	10.222	754.67	10.258	760.92
10.287	714.75	10.235	728.83	10.202	748.27	10.202	754.17	10.238	760.43
10.267	714.10	10.215	728.24	10.182	747.97	10.182	753.64	10.218	759.98
10.247	713.40	10.195	727.71	10.162	747.67	10.162	753.16	10.198	759.46
10.227	712.82	10.175	727.21	10.142	747.36	10.142	752.59	10.177	758.99
10.206	712.11	10.155	726.67	10.122	746.68	10.122	752.12	10.157	758.46
10.186	711.47	10.135	726.04	10.102	746.09	10.102	751.56	10.137	757.97
10.166	710.77	10.114	725.54	10.082	745.61	10.082	751.10	10.117	757.48
10.146	710.12	10.094	724.94	10.062	745.11	10.062	750.53	10.097	756.94
10.126	709.38	10.074	724.43	10.042	744.52	10.042	750.04	10.077	756.43
10.106	708.79	10.054	723.80	10.022	744.25	10.022	749.48	10.057	755.94
10.085	708.07	10.034	723.21	10.002	743.59	10.002	748.97	10.037	755.45
10.065	707.38	10.014	722.57	9.982	743.28	9.982	748.38	10.017	754.88
10.045	706.71	9.994	722.00	9.962	742.66	9.962	747.75	9.997	754.39
10.025	706.00	9.974	721.36	9.942	742.22	9.942	747.25	9.977	753.84
10.005	705.20	9.954	720.76	9.922	741.75	9.922	746.78	9.957	753.31
9.985	704.49	9.934	720.17	9.902	740.57	9.902	746.18	9.937	752.76
9.964	703.79	9.914	719.53	9.882	739.57	9.882	745.59	9.917	752.14
9.944	703.07	9.894	718.94	9.862	739.06	9.862	744.94	9.897	751.69
9.924	702.33	9.874	718.27	9.842	738.50	9.842	744.45	9.877	751.11
9.904	701.58	9.854	717.50	9.822	738.01	9.822	743.84	9.857	750.55
9.884	700.83	9.834	716.91	9.802	737.33	9.802	743.32	9.837	750.00
9.864	700.08	9.814	716.32	9.782	736.79	9.782	742.70	9.817	749.47
9.843	699.30	9.794	715.60	9.762	736.26	9.762	742.08	9.797	748.88
9.823	698.52	9.774	714.96	9.742	735.65	9.742	741.50	9.777	748.31
9.803	697.74	9.754	714.22	9.722	735.04	9.722	740.95	9.757	747.73
9.783	697.00	9.734	713.47	9.702	734.37	9.702	740.35	9.737	747.16
9.763	696.12	9.714	712.83	9.682	733.83	9.682	739.73	9.717	746.57
9.743	695.33	9.694	712.06	9.662	733.20	9.662	739.09	9.697	746.01
9.722	694.49	9.674	711.30	9.642	732.59	9.642	738.44	9.677	745.41
9.702	693.64	9.654	710.66	9.622	731.95	9.622	737.90	9.657	744.88

9.682	692.75	9.634	709.91	9.602	731.37	9.602	737.15	9.637	744.29
9.662	691.98	9.614	709.13	9.582	730.67	9.582	736.55	9.617	743.64
9.642	691.14	9.594	708.29	9.562	730.04	9.562	735.93	9.597	743.11
9.621	690.21	9.574	707.52	9.542	729.30	9.542	735.22	9.577	742.47
9.601	689.37	9.554	706.78	9.522	728.57	9.522	734.66	9.557	741.80
9.581	688.42	9.534	705.90	9.502	727.95	9.502	733.97	9.537	741.24
9.561	687.55	9.514	705.12	9.482	727.29	9.482	733.29	9.517	740.58
9.541	686.68	9.494	704.33	9.462	726.56	9.462	732.62	9.497	740.02
9.521	685.77	9.474	703.49	9.442	725.94	9.442	732.01	9.477	739.34
9.500	684.87	9.454	702.75	9.422	725.18	9.422	731.32	9.457	738.63
9.480	683.89	9.434	701.89	9.402	724.43	9.402	730.66	9.437	738.06
9.460	682.98	9.414	701.14	9.382	723.83	9.382	729.97	9.417	737.40
9.440	682.04	9.394	700.29	9.362	723.08	9.362	729.24	9.397	736.75
9.420	681.13	9.374	699.37	9.342	722.31	9.342	728.55	9.377	736.09
9.400	680.11	9.354	698.48	9.322	721.53	9.322	727.89	9.357	735.43
9.379	679.16	9.334	697.55	9.302	720.81	9.302	727.13	9.337	734.75
9.359	678.11	9.314	696.64	9.282	720.08	9.282	726.45	9.317	734.15
9.339	677.06	9.294	695.85	9.262	719.39	9.262	725.73	9.297	733.42
9.319	676.04	9.274	694.91	9.242	718.57	9.242	724.96	9.277	732.77
9.299	674.89	9.254	694.04	9.222	717.79	9.222	724.25	9.257	732.06
9.279	673.74	9.234	693.08	9.202	716.98	9.202	723.47	9.237	731.36
9.258	672.63	9.214	692.09	9.182	716.25	9.182	722.62	9.217	730.65
9.238	671.47	9.194	691.19	9.162	715.47	9.162	721.93	9.197	729.94
9.218	670.32	9.174	690.20	9.142	714.68	9.142	721.13	9.177	729.21
9.198	669.12	9.154	689.17	9.122	713.82	9.122	720.39	9.157	728.56
9.178	667.87	9.134	688.15	9.102	713.00	9.102	719.55	9.137	727.75
9.158	666.66	9.114	687.04	9.082	712.24	9.082	718.83	9.117	727.01
9.137	665.44	9.094	686.02	9.062	711.36	9.062	717.93	9.097	726.29
9.117	664.20	9.074	684.90	9.042	710.47	9.042	717.18	9.077	725.49
9.097	663.00	9.054	683.84	9.023	709.61	9.022	716.36	9.057	724.81
9.077	661.66	9.034	682.81	9.003	708.78	9.002	715.62	9.037	724.04
9.057	660.45	9.014	681.76	8.983	707.92	8.982	714.76	9.017	723.22
9.037	659.17	8.994	680.61	8.963	707.01	8.962	713.92	8.997	722.40

9.016	657.98	8.974	679.49	8.943	706.14	8.942	713.06	8.977	721.67
8.996	656.69	8.954	678.33	8.923	705.21	8.922	712.17	8.957	720.87
8.976	655.41	8.934	677.22	8.903	704.29	8.902	711.26	8.937	720.04
8.956	654.10	8.914	676.07	8.883	703.42	8.882	710.42	8.916	719.26
8.936	652.75	8.894	674.87	8.863	702.44	8.862	709.60	8.896	718.44
8.916	651.36	8.874	673.74	8.843	701.47	8.842	708.75	8.876	717.58
8.895	649.95	8.854	672.59	8.823	700.56	8.822	707.84	8.856	716.69
8.875	648.42	8.834	671.39	8.803	699.53	8.802	706.91	8.836	715.87
8.855	646.92	8.814	670.16	8.783	698.65	8.782	705.98	8.816	714.98
8.835	645.24	8.794	669.00	8.763	697.69	8.762	705.08	8.796	714.18
8.815	643.63	8.774	667.73	8.743	696.71	8.742	704.19	8.776	713.21
8.795	641.83	8.754	666.44	8.723	695.60	8.722	703.20	8.756	712.32
8.774	640.26	8.734	665.14	8.703	694.66	8.702	702.24	8.736	711.41
8.754	638.62	8.714	663.96	8.683	693.60	8.682	701.26	8.716	710.51
8.734	636.98	8.694	662.66	8.663	692.57	8.662	700.31	8.696	709.55
8.714	635.19	8.674	661.29	8.643	691.47	8.642	699.27	8.676	708.56
8.694	633.44	8.654	660.00	8.623	690.32	8.622	698.28	8.656	707.63
8.674	631.59	8.634	658.55	8.603	689.18	8.602	697.27	8.636	706.66
8.653	629.51	8.614	657.12	8.583	688.04	8.582	696.14	8.616	705.63
8.633	627.63	8.594	655.63	8.563	686.91	8.562	694.99	8.596	704.69
8.613	625.57	8.574	654.10	8.543	685.66	8.542	693.92	8.576	703.68
8.593	623.28	8.554	652.57	8.523	684.43	8.522	692.78	8.556	702.73
8.573	621.19	8.534	651.05	8.503	683.35	8.502	691.73	8.536	701.74
8.553	619.22	8.514	649.45	8.483	682.06	8.482	690.48	8.516	700.61
8.532	616.99	8.494	647.74	8.463	680.77	8.462	689.38	8.496	699.52
8.512	614.75	8.474	646.08	8.443	679.56	8.442	688.15	8.476	698.48
8.492	612.17	8.454	644.28	8.423	678.23	8.422	686.82	8.456	697.31
8.472	609.52	8.434	642.50	8.403	676.85	8.402	685.57	8.436	696.19
8.452	606.92	8.414	640.75	8.383	675.51	8.382	684.40	8.416	695.12
8.432	604.42	8.394	638.98	8.363	674.08	8.362	683.05	8.396	693.88
8.411	601.79	8.374	636.91	8.343	672.61	8.342	681.75	8.376	692.72
8.391	599.02	8.354	635.01	8.323	671.03	8.322	680.34	8.356	691.57
8.371	596.56	8.334	632.94	8.303	669.53	8.302	678.90	8.336	690.40

8.351	594.91	8.314	630.79	8.283	668.01	8.282	677.49	8.316	689.20
8.331	592.96	8.294	628.54	8.263	666.34	8.262	676.00	8.296	687.81
8.311	590.81	8.274	626.53	8.243	664.68	8.242	674.52	8.276	686.47
8.290	588.38	8.254	624.25	8.223	663.13	8.222	672.87	8.256	685.21
8.270	585.72	8.234	621.90	8.203	661.50	8.202	671.39	8.236	683.93
8.250	582.94	8.214	619.29	8.183	659.72	8.182	670.00	8.216	682.56
8.230	579.71	8.194	616.79	8.163	657.89	8.162	668.54	8.196	681.25
8.210	576.05	8.174	613.94	8.143	655.91	8.142	666.83	8.176	679.66
8.190	571.97	8.154	611.14	8.123	654.03	8.122	665.02	8.156	678.36
8.169	567.69	8.134	608.00	8.103	652.18	8.102	663.38	8.136	676.87
8.149	562.85	8.114	605.03	8.083	650.10	8.082	661.57	8.116	675.39
8.129	558.21	8.094	601.75	8.063	647.84	8.062	659.67	8.096	673.77
8.109	551.96	8.074	598.02	8.043	645.81	8.042	657.84	8.076	672.02
8.089	546.24	8.054	594.42	8.023	643.62	8.022	655.91	8.056	670.31
8.069	539.15	8.034	590.26	8.003	641.27	8.002	653.88	8.036	668.53
8.048	532.18	8.014	586.14	7.983	638.74	7.982	651.65	8.016	666.90
8.028	524.98	7.994	581.77	7.963	636.41	7.962	649.60	7.996	665.02
8.008	517.33	7.974	577.63	7.943	633.33	7.942	647.32	7.976	663.11
7.988	508.83	7.954	571.43	7.923	630.69	7.922	644.93	7.956	661.19
7.968	500.03	7.934	565.27	7.903	627.44	7.902	642.61	7.936	659.16
7.948	490.44	7.914	558.45	7.883	624.41	7.882	639.95	7.916	657.04
7.927	479.99	7.894	551.26	7.863	621.31	7.862	637.16	7.896	654.97
7.907	468.93	7.874	543.72	7.843	618.15	7.842	634.49	7.876	652.91
7.887	458.33	7.854	533.10	7.823	614.88	7.822	631.35	7.856	650.42
7.867	446.25	7.834	523.51	7.803	611.04	7.802	627.78	7.836	648.09
7.847	434.72	7.814	511.23	7.783	606.86	7.782	624.31	7.816	645.72
7.827	422.58	7.794	499.28	7.763	602.35	7.762	620.23	7.796	643.25
7.806	410.76	7.774	484.93	7.743	597.23	7.742	616.35	7.776	640.24
7.786	398.75	7.754	469.68	7.723	591.47	7.722	611.01	7.756	637.49
7.766	387.76	7.734	453.65	7.703	584.75	7.702	606.41	7.736	634.32
7.746	376.64	7.714	437.32	7.683	579.01	7.682	600.83	7.716	631.02
7.726	366.64	7.694	420.97	7.663	572.84	7.662	594.34	7.696	627.63
7.706	357.41	7.674	404.79	7.643	565.65	7.642	587.55	7.676	623.57

7.685	348.80	7.654	389.69	7.623	554.74	7.622	579.28	7.655	619.94
7.665	340.90	7.634	375.65	7.603	540.64	7.602	568.99	7.635	614.81
7.645	333.62	7.614	362.33	7.583	521.86	7.582	557.09	7.615	609.73
7.625	327.04	7.594	351.46	7.563	501.12	7.562	545.95	7.595	604.16
7.605	320.78	7.574	341.23	7.543	475.92	7.542	540.38	7.575	597.32
7.585	314.83	7.553	332.65	7.523	440.66	7.522	533.68	7.555	588.66
7.564	309.70	7.533	325.14	7.503	408.55	7.501	527.88	7.535	582.12
7.544	304.57	7.513	318.59	7.483	380.43	7.482	507.81	7.515	575.87
7.524	299.88	7.493	312.62	7.463	357.05	7.464	477.09	7.495	568.85
7.504	295.20	7.473	306.97	7.443	341.25	7.445	443.35	7.475	558.49
7.484	290.99	7.453	301.82	7.423	330.30	7.426	414.58	7.455	543.74
7.464	286.90	7.433	296.94	7.403	319.94	7.407	378.01	7.435	519.11
7.443	283.08	7.413	292.42	7.383	311.26	7.389	357.02	7.415	472.81
7.423	279.31	7.393	288.20	7.363	304.49	7.370	341.53	7.395	431.25
7.403	275.77	7.373	284.21	7.343	298.17	7.351	330.65	7.375	370.86
7.383	272.32	7.353	280.18	7.323	292.38	7.333	321.29	7.355	343.59
7.363	268.97	7.333	276.41	7.303	287.20	7.314	313.11	7.335	328.05
7.343	265.58	7.313	272.84	7.283	282.00	7.295	306.11	7.315	317.60
7.322	261.96	7.293	269.56	7.263	277.24	7.276	299.81	7.295	309.21
7.302	258.79	7.273	266.40	7.243	272.83	7.258	294.38	7.275	301.98
7.282	256.39	7.253	263.25	7.223	269.21	7.239	289.16	7.255	295.76
7.262	253.87	7.233	260.25	7.203	265.89	7.220	284.75	7.235	290.29
7.242	251.37	7.213	257.41	7.183	262.58	7.201	280.52	7.215	285.28
7.222	248.94	7.193	254.62	7.163	259.50	7.182	279.23	7.195	280.64
7.201	246.61	7.173	251.83	7.143	256.55	7.162	274.64	7.175	276.42
7.181	244.28	7.153	249.13	7.123	253.58	7.142	270.75	7.155	272.40
7.161	241.98	7.133	246.53	7.103	250.75	7.122	266.47	7.135	268.54
7.141	239.79	7.113	244.21	7.083	248.12	7.102	262.93	7.115	265.08
7.121	237.83	7.093	241.95	7.063	245.56	7.082	259.84	7.095	261.68
7.101	235.74	7.073	239.75	7.043	243.23	7.062	256.50	7.075	258.56
7.080	233.69	7.053	237.59	7.023	240.73	7.042	253.45	7.055	255.39
7.060	231.70	7.033	235.45	7.003	238.44	7.022	250.41	7.035	252.49
7.040	229.73	7.013	233.39	6.983	236.26	7.002	247.49	7.015	249.76

7.020	227.77	6.993	231.27	6.963	234.10	6.982	244.74	6.995	246.95
7.000	225.84	6.973	229.39	6.943	231.94	6.962	242.07	6.975	244.42
6.980	223.94	6.953	227.77	6.923	229.86	6.942	239.44	6.955	241.75
6.959	222.13	6.933	225.76	6.903	227.82	6.922	236.71	6.935	239.40
6.939	220.36	6.913	224.16	6.883	225.95	6.902	234.63	6.915	236.92
6.919	218.76	6.893	222.35	6.863	224.04	6.882	232.35	6.895	234.64
6.899	217.04	6.873	220.37	6.843	222.23	6.862	229.97	6.875	232.40
6.879	215.43	6.853	218.61	6.823	220.54	6.842	227.81	6.855	230.24
6.859	213.81	6.833	216.82	6.803	218.75	6.822	225.48	6.835	228.20
6.838	212.23	6.813	215.09	6.783	216.99	6.802	223.63	6.815	226.07
6.818	210.72	6.793	213.49	6.763	215.36	6.782	221.57	6.795	224.07
6.798	209.15	6.773	211.91	6.743	213.66	6.762	219.63	6.775	221.99
6.778	207.65	6.753	210.31	6.723	212.06	6.742	217.76	6.755	219.19
6.758	206.09	6.733	208.75	6.703	210.40	6.722	215.86	6.735	217.34
6.738	204.65	6.713	207.36	6.684	208.97	6.702	213.92	6.715	215.73
6.717	203.15	6.693	205.93	6.664	207.43	6.682	212.25	6.695	213.96
6.697	201.63	6.673	204.31	6.644	206.05	6.662	210.49	6.675	212.23
6.677	200.21	6.653	202.72	6.624	204.53	6.642	208.84	6.655	210.64
6.657	198.80	6.633	201.57	6.604	203.08	6.622	207.10	6.635	209.05
6.637	197.42	6.613	200.07	6.584	201.56	6.602	205.50	6.615	207.39
6.617	195.99	6.593	198.71	6.564	200.11	6.582	203.90	6.595	205.83
6.596	194.62	6.573	197.33	6.544	198.65	6.562	202.32	6.575	204.22
6.576	193.32	6.553	195.86	6.524	197.30	6.542	200.54	6.555	202.60
6.556	192.00	6.533	194.56	6.504	195.93	6.522	199.12	6.535	201.06
6.536	190.67	6.513	193.07	6.484	194.90	6.502	197.69	6.515	199.51
6.516	189.34	6.493	191.72	6.464	193.38	6.482	194.82	6.495	198.02
6.496	188.11	6.473	190.39	6.444	192.18	6.462	193.46	6.475	196.49
6.475	186.80	6.453	189.21	6.424	190.92	6.442	192.12	6.455	195.10
6.455	185.57	6.433	187.86	6.404	189.51	6.422	190.82	6.435	193.73
6.435	184.27	6.413	186.69	6.384	188.34	6.402	189.67	6.414	192.43
6.415	183.08	6.393	185.40	6.364	187.21	6.382	188.34	6.394	191.08
6.395	181.84	6.373	184.12	6.344	186.02	6.362	187.00	6.374	189.76
6.375	180.65	6.353	182.86	6.324	184.79	6.342	185.72	6.354	188.46

6.354	179.45	6.333	181.56	6.304	183.58	6.322	184.52	6.334	187.08
6.334	178.29	6.313	180.46	6.284	182.33	6.302	183.24	6.314	185.78
6.314	177.16	6.293	179.25	6.264	181.05	6.282	182.06	6.294	184.53
6.294	176.04	6.273	178.07	6.244	179.74	6.262	180.83	6.274	183.24
6.274	174.76	6.253	176.91	6.224	178.56	6.242	179.69	6.254	181.99
6.254	173.78	6.233	175.59	6.204	177.66	6.222	178.63	6.234	180.77
6.233	172.69	6.213	174.47	6.184	176.47	6.202	177.54	6.214	179.59
6.213	171.48	6.193	173.48	6.164	175.35	6.182	176.38	6.194	178.36
6.193	170.51	6.173	172.20	6.144	174.19	6.162	175.20	6.174	177.18
6.173	169.36	6.153	171.25	6.124	173.10	6.142	174.12	6.154	175.98
6.153	168.30	6.133	170.19	6.104	171.76	6.122	172.98	6.134	174.80
6.133	167.25	6.113	169.04	6.084	170.77	6.102	171.92	6.114	173.66
6.112	166.21	6.093	167.95	6.064	169.56	6.082	170.73	6.094	172.50
6.092	165.19	6.073	166.73	6.044	168.73	6.062	169.79	6.074	171.37
6.072	164.11	6.053	165.65	6.024	167.61	6.042	168.64	6.054	170.18
6.052	163.07	6.033	164.88	6.004	166.54	6.022	167.62	6.034	169.09
6.032	162.10	6.013	163.71	5.984	165.51	6.002	166.49	6.014	168.03
6.012	160.96	5.993	162.75	5.964	164.49	5.982	165.35	5.994	166.90
5.991	160.09	5.973	161.73	5.944	163.36	5.962	164.44	5.974	165.83
5.971	159.07	5.953	160.62	5.924	162.38	5.942	163.38	5.954	164.74
5.951	157.98	5.933	159.47	5.904	161.20	5.922	162.35	5.934	163.59
5.931	157.13	5.913	158.51	5.884	160.33	5.902	161.31	5.914	162.55
5.911	156.04	5.893	157.81	5.864	159.24	5.882	160.21	5.894	161.52
5.891	155.19	5.873	156.82	5.844	158.40	5.862	159.23	5.874	160.39
5.870	154.18	5.853	155.88	5.824	157.39	5.842	158.39	5.854	159.38
5.850	153.20	5.833	154.79	5.804	156.41	5.822	157.38	5.834	158.42
5.830	152.36	5.813	153.71	5.784	155.45	5.802	156.43	5.814	157.38
5.810	151.42	5.793	152.64	5.764	154.49	5.782	155.47	5.794	156.35
5.790	150.45	5.773	151.78	5.744	153.53	5.762	154.38	5.774	155.39
5.770	149.56	5.753	150.94	5.724	152.60	5.742	153.46	5.754	154.38
5.749	148.56	5.733	149.83	5.704	151.63	5.722	152.49	5.734	153.43
5.729	147.71	5.713	149.03	5.684	150.56	5.702	151.68	5.714	152.45
5.709	146.84	5.693	148.17	5.664	149.51	5.682	150.74	5.694	151.53

5.689	145.95	5.673	147.33	5.644	148.65	5.662	149.85	5.674	150.57
5.669	145.10	5.653	146.21	5.624	147.84	5.642	148.92	5.654	149.57
5.649	144.07	5.633	145.53	5.604	146.78	5.622	147.82	5.634	148.66
5.628	143.36	5.613	144.66	5.584	146.13	5.602	147.09	5.614	147.75
5.608	142.43	5.593	143.69	5.564	145.20	5.582	146.09	5.594	146.80
5.588	141.59	5.573	142.74	5.544	144.24	5.562	145.34	5.574	145.90
5.568	140.73	5.553	141.78	5.524	143.11	5.542	144.45	5.554	144.99
5.548	139.87	5.533	140.87	5.504	142.18	5.522	143.52	5.534	144.07
5.528	139.00	5.513	140.25	5.484	141.62	5.502	142.55	5.514	143.18
5.507	138.18	5.493	139.21	5.464	140.37	5.482	141.55	5.494	142.33
5.487	137.32	5.473	138.31	5.444	139.85	5.462	140.93	5.474	141.44
5.467	136.50	5.453	137.71	5.424	139.03	5.442	140.04	5.454	140.59
5.447	135.70	5.433	136.86	5.404	138.14	5.422	139.14	5.434	139.65
5.427	134.80	5.413	136.02	5.384	137.27	5.402	138.29	5.414	138.75
5.407	133.93	5.393	135.22	5.364	136.42	5.382	137.44	5.394	137.92
5.386	133.22	5.373	134.37	5.344	135.61	5.362	136.49	5.374	137.07
5.366	132.46	5.353	133.53	5.324	134.78	5.342	135.74	5.354	136.24
5.346	131.63	5.333	132.74	5.304	133.88	5.322	134.75	5.334	135.36
5.326	130.83	5.313	131.95	5.284	133.03	5.302	134.01	5.314	134.52
5.306	130.07	5.293	131.15	5.264	132.24	5.282	133.03	5.294	133.73
5.286	129.27	5.273	130.31	5.244	131.45	5.262	132.41	5.274	132.86
5.265	128.53	5.253	129.52	5.224	130.64	5.242	131.41	5.254	132.04
5.245	127.72	5.233	128.78	5.204	129.84	5.222	130.78	5.234	131.21
5.225	126.83	5.213	127.72	5.184	129.08	5.202	129.92	5.214	130.43
5.205	126.18	5.193	127.21	5.164	127.99	5.182	129.07	5.194	129.62
5.185	125.43	5.173	126.41	5.144	127.35	5.162	128.20	5.174	128.78
5.165	124.64	5.153	125.63	5.124	126.48	5.142	127.58	5.153	128.03
5.144	123.89	5.133	124.89	5.104	125.73	5.122	126.74	5.133	127.24
5.124	123.04	5.113	124.12	5.084	125.13	5.102	125.83	5.113	126.49
5.104	122.41	5.093	123.28	5.064	124.40	5.082	125.24	5.093	125.75
5.084	121.66	5.073	122.58	5.044	123.54	5.062	124.36	5.073	124.96
5.064	120.85	5.053	121.68	5.024	122.71	5.042	123.53	5.053	124.14
5.044	120.10	5.033	121.12	5.004	122.00	5.022	122.81	5.033	123.40

5.023	119.48	5.013	120.43	4.984	121.29	5.002	122.20	5.013	122.59
5.003	118.71	4.992	119.69	4.964	120.51	4.982	121.36	4.993	121.92
4.983	117.98	4.972	118.90	4.944	119.76	4.962	120.65	4.973	121.18
4.963	117.31	4.952	118.08	4.924	119.01	4.942	119.85	4.953	120.38
4.943	116.58	4.932	117.28	4.904	118.28	4.922	119.20	4.933	119.65
4.923	115.84	4.912	116.55	4.884	117.55	4.902	118.49	4.913	118.85
4.902	115.20	4.892	116.01	4.864	116.80	4.882	117.76	4.893	118.15
4.882	114.42	4.872	115.15	4.844	116.01	4.862	116.96	4.873	117.44
4.862	113.82	4.852	114.42	4.824	115.22	4.842	116.29	4.853	116.71
4.842	113.09	4.832	113.82	4.804	114.46	4.822	115.52	4.833	115.99
4.822	112.33	4.812	113.13	4.784	113.74	4.802	114.81	4.813	115.23
4.801	111.71	4.792	112.27	4.764	113.33	4.782	113.91	4.793	114.56
4.781	110.94	4.772	111.64	4.744	112.45	4.762	113.21	4.773	113.84
4.761	110.31	4.752	111.08	4.724	111.65	4.742	112.69	4.753	113.15
4.741	109.66	4.732	110.30	4.704	110.88	4.722	111.96	4.733	112.40
4.721	108.95	4.712	109.58	4.684	110.39	4.702	111.26	4.713	111.67
4.701	108.23	4.692	108.96	4.664	109.74	4.682	110.58	4.693	111.01
4.680	107.71	4.672	108.42	4.644	108.92	4.662	109.83	4.673	110.29
4.660	106.96	4.652	107.70	4.624	108.16	4.642	109.12	4.653	109.63
4.640	106.35	4.632	107.06	4.604	107.60	4.622	108.49	4.633	108.93
4.620	105.55	4.612	106.39	4.584	107.12	4.602	107.78	4.613	108.23
4.600	105.01	4.592	105.73	4.564	106.47	4.582	107.11	4.593	107.55
4.580	104.35	4.572	105.04	4.544	105.71	4.562	106.47	4.573	106.89
4.559	103.72	4.552	104.41	4.524	104.98	4.542	105.65	4.553	106.20
4.539	103.02	4.532	103.72	4.504	104.36	4.522	105.12	4.533	105.57
4.519	102.46	4.512	103.03	4.484	103.74	4.502	104.44	4.513	104.85
4.499	101.77	4.492	102.36	4.464	103.04	4.482	103.72	4.493	104.21
4.479	101.14	4.472	101.81	4.444	102.32	4.462	103.13	4.473	103.57
4.459	100.44	4.452	101.04	4.424	101.72	4.442	102.35	4.453	102.92
4.438	99.85	4.432	100.47	4.404	101.13	4.422	101.79	4.433	102.21
4.418	99.24	4.412	99.90	4.384	100.50	4.402	101.00	4.413	101.60
4.398	98.62	4.392	99.24	4.364	99.85	4.382	100.32	4.393	100.93
4.378	97.97	4.372	98.64	4.344	99.08	4.362	99.80	4.373	100.27

4.358	97.33	4.352	98.03	4.325	98.31	4.342	99.24	4.353	99.68
4.338	96.68	4.332	97.25	4.305	97.80	4.322	98.52	4.333	99.03
4.317	96.10	4.312	96.80	4.285	97.33	4.302	97.94	4.313	98.30
4.297	95.53	4.292	96.17	4.265	96.67	4.282	97.31	4.293	97.75
4.277	94.85	4.272	95.51	4.245	96.04	4.262	96.66	4.273	97.11
4.257	94.21	4.252	94.82	4.225	95.39	4.242	96.06	4.253	96.50
4.237	93.64	4.232	94.35	4.205	94.73	4.222	95.31	4.233	95.84
4.217	92.99	4.212	93.72	4.185	94.13	4.202	94.76	4.213	95.25
4.196	92.46	4.192	93.11	4.165	93.35	4.182	94.05	4.193	94.57
4.176	91.88	4.172	92.52	4.145	92.68	4.162	93.44	4.173	93.98
4.156	91.24	4.152	91.81	4.125	92.11	4.142	92.93	4.153	93.38
4.136	90.68	4.132	91.13	4.105	91.70	4.122	92.35	4.133	92.70
4.116	90.10	4.112	90.60	4.085	91.10	4.102	91.59	4.113	92.12
4.096	89.50	4.092	90.01	4.065	90.49	4.082	91.14	4.093	91.50
4.075	88.92	4.072	89.32	4.045	89.87	4.062	90.52	4.073	90.89
4.055	88.34	4.052	88.82	4.025	89.23	4.042	89.78	4.053	90.36
4.035	87.73	4.032	88.31	4.005	88.67	4.022	89.32	4.033	89.69
4.015	87.14	4.012	87.69	3.985	88.09	4.002	88.70	4.013	89.13
3.995	86.56	3.992	87.06	3.965	87.48	3.982	88.17	3.993	88.53
3.975	86.03	3.972	86.59	3.945	86.89	3.962	87.52	3.973	87.93
3.954	85.43	3.952	85.95	3.925	86.34	3.942	86.87	3.953	87.36
3.934	84.87	3.932	85.36	3.905	85.75	3.922	86.41	3.933	86.73
3.914	84.28	3.912	84.85	3.885	85.09	3.902	85.68	3.913	86.17
3.894	83.75	3.892	84.26	3.865	84.38	3.882	85.21	3.892	85.59
3.874	83.14	3.872	83.67	3.845	83.79	3.862	84.49	3.872	84.99
3.854	82.59	3.852	83.16	3.825	83.26	3.842	84.04	3.852	84.42
3.833	82.06	3.832	82.60	3.805	82.82	3.822	83.45	3.832	83.86
3.813	81.49	3.812	82.06	3.785	82.28	3.802	82.87	3.812	83.30
3.793	80.90	3.792	81.40	3.765	81.67	3.782	82.28	3.792	82.72
3.773	80.34	3.772	80.82	3.745	81.10	3.762	81.73	3.772	82.14
3.753	79.80	3.752	80.23	3.725	80.55	3.742	81.18	3.752	81.59
3.733	79.24	3.732	79.63	3.705	79.98	3.722	80.62	3.732	81.08
3.712	78.69	3.712	79.24	3.685	79.41	3.702	80.10	3.712	80.49

3.692	78.15	3.692	78.61	3.665	78.87	3.682	79.53	3.692	79.89
3.672	77.65	3.672	77.99	3.645	78.33	3.662	78.96	3.672	79.38
3.652	77.07	3.652	77.58	3.625	77.73	3.642	78.43	3.652	78.79
3.632	76.52	3.632	76.93	3.605	77.17	3.622	77.89	3.632	78.25
3.612	76.01	3.612	76.56	3.585	76.66	3.602	77.31	3.612	77.66
3.591	75.45	3.592	76.01	3.565	75.95	3.582	76.63	3.592	77.11
3.571	74.92	3.572	75.47	3.545	75.47	3.562	76.12	3.572	76.58
3.551	74.39	3.552	74.92	3.525	75.00	3.542	75.59	3.552	76.06
3.531	73.78	3.532	74.39	3.505	74.45	3.522	75.16	3.532	75.51
3.511	73.31	3.512	73.79	3.485	73.89	3.502	74.58	3.512	75.00
3.491	72.76	3.492	73.32	3.465	73.36	3.482	74.01	3.492	74.43
3.470	72.23	3.472	72.79	3.445	72.84	3.462	73.49	3.472	73.86
3.450	71.71	3.452	72.29	3.425	72.31	3.442	72.91	3.452	73.36
3.430	71.22	3.432	71.74	3.405	71.78	3.422	72.30	3.432	72.81
3.410	70.68	3.412	71.18	3.385	71.24	3.402	71.92	3.412	72.26
3.390	70.20	3.392	70.74	3.365	70.68	3.382	71.39	3.392	71.78
3.370	69.66	3.372	70.13	3.345	70.02	3.362	70.86	3.372	71.22
3.349	69.17	3.352	69.60	3.325	69.59	3.342	70.23	3.352	70.70
3.329	68.60	3.332	69.08	3.305	69.10	3.322	69.80	3.332	70.16
3.309	68.14	3.312	68.66	3.285	68.57	3.302	69.24	3.312	69.65
3.289	67.63	3.292	68.08	3.265	68.04	3.282	68.74	3.292	69.16
3.269	67.11	3.272	67.56	3.245	67.57	3.262	68.11	3.272	68.64
3.249	66.55	3.252	67.11	3.225	67.09	3.242	67.75	3.252	68.10
3.228	66.08	3.232	66.49	3.205	66.59	3.222	67.20	3.232	67.60
3.208	65.55	3.212	66.02	3.185	65.86	3.202	66.69	3.212	67.05
3.188	65.03	3.192	65.59	3.165	65.35	3.182	66.20	3.192	66.56
3.168	64.59	3.172	65.06	3.145	64.88	3.162	65.69	3.172	66.04
3.148	64.05	3.152	64.56	3.125	64.41	3.142	65.16	3.152	65.54
3.128	63.56	3.132	64.09	3.105	64.01	3.122	64.63	3.132	64.99
3.107	63.06	3.112	63.57	3.085	63.41	3.102	64.13	3.112	64.55
3.087	62.53	3.092	63.00	3.065	62.93	3.082	63.63	3.092	63.99
3.067	62.09	3.072	62.58	3.045	62.50	3.062	63.13	3.072	63.48
3.047	61.56	3.052	62.09	3.025	62.00	3.042	62.65	3.052	63.00

3.027	61.11	3.032	61.60	3.005	61.49	3.022	62.15	3.032	62.48
3.007	60.56	3.012	61.11	2.985	60.98	3.002	61.63	3.012	62.05
2.986	60.11	2.992	60.63	2.965	60.49	2.982	61.18	2.992	61.50
2.966	59.61	2.972	60.12	2.945	60.00	2.962	60.70	2.972	61.00
2.946	59.18	2.952	59.68	2.925	59.46	2.942	60.19	2.952	60.56
2.926	58.64	2.932	59.13	2.905	59.03	2.922	59.66	2.932	60.02
2.906	58.16	2.912	58.67	2.885	58.55	2.902	59.23	2.912	59.53
2.886	57.69	2.892	58.16	2.865	58.01	2.882	58.69	2.892	59.06
2.865	57.24	2.872	57.65	2.845	57.56	2.862	58.14	2.872	58.55
2.845	56.70	2.852	57.21	2.825	56.91	2.842	57.78	2.852	58.07
2.825	56.25	2.832	56.70	2.805	56.58	2.822	57.23	2.832	57.59
2.805	55.79	2.812	56.25	2.785	55.99	2.802	56.79	2.812	57.12
2.785	55.33	2.792	55.80	2.765	55.64	2.782	56.31	2.792	56.61
2.765	54.87	2.772	55.31	2.745	55.16	2.762	55.85	2.772	56.19
2.744	54.41	2.752	54.82	2.725	54.67	2.742	55.28	2.752	55.69
2.724	53.92	2.732	54.37	2.705	54.14	2.722	54.90	2.732	55.22
2.704	53.45	2.712	53.89	2.685	53.68	2.702	54.40	2.712	54.64
2.684	52.98	2.692	53.43	2.665	53.22	2.682	53.90	2.692	54.18
2.664	52.51	2.672	52.96	2.645	52.75	2.662	53.48	2.672	53.73
2.644	52.07	2.652	52.56	2.625	52.33	2.642	52.95	2.652	53.28
2.623	51.58	2.632	52.08	2.605	51.89	2.622	52.46	2.631	52.79
2.603	51.14	2.612	51.67	2.585	51.43	2.602	52.05	2.611	52.37
2.583	50.65	2.592	51.23	2.565	50.94	2.582	51.57	2.591	51.88
2.563	50.22	2.572	50.75	2.545	50.49	2.562	51.07	2.571	51.39
2.543	49.73	2.552	50.32	2.525	50.04	2.542	50.64	2.551	50.96
2.523	49.26	2.532	49.87	2.505	49.55	2.522	50.17	2.531	50.45
2.502	48.84	2.512	49.38	2.485	49.05	2.502	49.70	2.511	49.96
2.482	48.38	2.492	48.88	2.465	48.62	2.482	49.23	2.491	49.58
2.462	47.93	2.472	48.42	2.445	48.20	2.462	48.81	2.471	49.12
2.442	47.48	2.452	48.00	2.425	47.74	2.442	48.37	2.451	48.66
2.422	46.99	2.431	47.60	2.405	47.23	2.422	47.87	2.431	48.15
2.402	46.53	2.411	47.09	2.385	46.82	2.402	47.37	2.411	47.70
2.381	46.16	2.391	46.61	2.365	46.33	2.382	47.00	2.391	47.23

2.361	45.67	2.371	46.17	2.345	45.98	2.362	46.52	2.371	46.82
2.341	45.26	2.351	45.75	2.325	45.51	2.342	46.04	2.351	46.31
2.321	44.78	2.331	45.33	2.305	45.04	2.322	45.57	2.331	45.84
2.301	44.35	2.311	44.87	2.285	44.56	2.302	45.20	2.311	45.43
2.281	43.93	2.291	44.42	2.265	44.07	2.282	44.74	2.291	44.99
2.260	43.50	2.271	44.00	2.245	43.72	2.262	44.28	2.271	44.56
2.240	43.05	2.251	43.56	2.225	43.31	2.242	43.84	2.251	44.07
2.220	42.62	2.231	43.06	2.205	42.86	2.222	43.38	2.231	43.64
2.200	42.18	2.211	42.65	2.185	42.40	2.202	43.00	2.211	43.19
2.180	41.70	2.191	42.23	2.165	41.96	2.182	42.53	2.191	42.75
2.160	41.33	2.171	41.79	2.145	41.47	2.162	42.11	2.171	42.31
2.139	40.85	2.151	41.32	2.125	41.00	2.142	41.65	2.151	41.84
2.119	40.45	2.131	40.83	2.105	40.71	2.122	41.22	2.131	41.46
2.099	40.03	2.111	40.44	2.085	40.22	2.102	40.81	2.111	41.00
2.079	39.62	2.091	39.99	2.065	39.74	2.082	40.30	2.091	40.60
2.059	39.18	2.071	39.59	2.045	39.36	2.062	39.91	2.071	40.12
2.039	38.76	2.051	39.13	2.025	38.90	2.042	39.46	2.051	39.73
2.018	38.32	2.031	38.75	2.005	38.43	2.022	39.08	2.031	39.26
1.998	37.90	2.011	38.34	1.986	38.09	2.002	38.59	2.011	38.89
1.978	37.47	1.991	37.90	1.966	37.63	1.982	38.22	1.991	38.44
1.958	37.07	1.971	37.49	1.946	37.23	1.962	37.76	1.971	38.01
1.938	36.66	1.951	37.09	1.926	36.82	1.942	37.36	1.951	37.54
1.918	36.20	1.931	36.66	1.906	36.34	1.922	36.88	1.931	37.13
1.897	35.79	1.911	36.21	1.886	35.96	1.902	36.48	1.911	36.68
1.877	35.33	1.891	35.79	1.866	35.53	1.882	36.07	1.891	36.30
1.857	34.94	1.871	35.39	1.846	35.08	1.862	35.64	1.871	35.83
1.837	34.55	1.851	34.95	1.826	34.70	1.842	35.23	1.851	35.43
1.817	34.11	1.831	34.50	1.806	34.28	1.822	34.84	1.831	34.94
1.797	33.71	1.811	34.09	1.786	33.86	1.802	34.34	1.811	34.59
1.776	33.28	1.791	33.68	1.766	33.42	1.782	33.99	1.791	34.17
1.756	32.91	1.771	33.22	1.746	33.05	1.762	33.60	1.771	33.73
1.736	32.46	1.751	32.82	1.726	32.65	1.742	33.19	1.751	33.36
1.716	32.04	1.731	32.46	1.706	32.20	1.722	32.66	1.731	32.90

1.696	31.66	1.711	31.92	1.686	31.78	1.702	32.35	1.711	32.50
1.676	31.24	1.691	31.48	1.666	31.39	1.682	31.90	1.691	32.06
1.655	30.81	1.671	31.20	1.646	30.94	1.662	31.49	1.671	31.66
1.635	30.41	1.651	30.82	1.626	30.56	1.642	31.09	1.651	31.25
1.615	29.98	1.631	30.42	1.606	30.15	1.622	30.60	1.631	30.84
1.595	29.62	1.611	30.00	1.586	29.77	1.602	30.20	1.611	30.43
1.575	29.19	1.591	29.57	1.566	29.32	1.582	29.84	1.591	30.05
1.555	28.76	1.571	29.07	1.546	28.92	1.562	29.50	1.571	29.57
1.534	28.36	1.551	28.67	1.526	28.55	1.542	29.00	1.551	29.21
1.514	27.97	1.531	28.40	1.506	28.17	1.522	28.59	1.531	28.80
1.494	27.62	1.511	27.99	1.486	27.74	1.502	28.21	1.511	28.40
1.474	27.20	1.491	27.58	1.466	27.36	1.482	27.79	1.491	28.01
1.454	26.75	1.471	27.18	1.446	26.94	1.462	27.43	1.471	27.56
1.434	26.36	1.451	26.79	1.426	26.51	1.442	27.02	1.451	27.21
1.413	25.96	1.431	26.42	1.406	26.12	1.422	26.60	1.431	26.81
1.393	25.57	1.411	25.96	1.386	25.71	1.402	26.27	1.411	26.41
1.373	25.19	1.391	25.53	1.366	25.33	1.382	25.84	1.391	25.99
1.353	24.78	1.371	25.15	1.346	24.96	1.362	25.40	1.370	25.58
1.333	24.39	1.351	24.75	1.326	24.55	1.342	25.05	1.350	25.18
1.313	24.02	1.331	24.35	1.306	24.16	1.322	24.59	1.330	24.78
1.292	23.60	1.311	23.94	1.286	23.74	1.302	24.20	1.310	24.39
1.272	23.21	1.291	23.64	1.266	23.39	1.282	23.83	1.290	23.99
1.252	22.81	1.271	23.26	1.246	22.96	1.262	23.43	1.270	23.63
1.232	22.42	1.251	22.87	1.226	22.58	1.242	23.03	1.250	23.21
1.212	22.07	1.231	22.48	1.206	22.12	1.222	22.65	1.230	22.81
1.192	21.63	1.211	22.07	1.186	21.79	1.202	22.22	1.210	22.41
1.171	21.27	1.191	21.66	1.166	21.37	1.182	21.85	1.190	22.08
1.151	20.87	1.171	21.23	1.146	20.96	1.162	21.55	1.170	21.63
1.131	20.53	1.151	20.87	1.126	20.63	1.142	21.16	1.150	21.24
1.111	20.14	1.131	20.46	1.106	20.22	1.122	20.75	1.130	20.85
1.091	19.74	1.111	20.16	1.086	19.86	1.102	20.32	1.110	20.48
1.071	19.35	1.091	19.80	1.066	19.44	1.082	19.95	1.090	20.06
1.050	19.00	1.071	19.43	1.046	19.07	1.062	19.52	1.070	19.71

1.030	18.62	1.051	18.99	1.026	18.67	1.042	19.20	1.050	19.35
1.010	18.25	1.031	18.66	1.006	18.25	1.022	18.78	1.030	18.96
0.990	17.85	1.011	18.24	0.986	17.91	1.002	18.35	1.010	18.56
0.970	17.47	0.991	17.84	0.966	17.50	0.982	17.98	0.990	18.21
0.950	17.15	0.971	17.51	0.946	17.19	0.962	17.54	0.970	17.80
0.929	16.75	0.951	17.10	0.926	16.77	0.942	17.14	0.950	17.44
0.909	16.36	0.931	16.67	0.906	16.44	0.922	16.81	0.930	17.01
0.889	15.97	0.911	16.35	0.886	16.05	0.902	16.46	0.910	16.62
0.869	15.64	0.891	15.94	0.866	15.67	0.882	16.05	0.890	16.22
0.849	15.26	0.871	15.61	0.846	15.35	0.862	15.73	0.870	15.88
0.829	14.86	0.851	15.24	0.826	14.94	0.842	15.33	0.850	15.46
0.808	14.47	0.831	14.90	0.806	14.55	0.822	14.91	0.830	15.09
0.788	14.08	0.811	14.54	0.786	14.19	0.802	14.57	0.810	14.71
0.768	13.68	0.791	14.10	0.766	13.84	0.782	14.20	0.790	14.35
0.748	13.29	0.771	13.80	0.746	13.45	0.762	13.84	0.770	13.99
0.728	12.98	0.751	13.45	0.726	13.10	0.742	13.47	0.750	13.61
0.708	12.58	0.731	13.03	0.706	12.74	0.722	13.05	0.730	13.20
0.687	12.19	0.711	12.66	0.686	12.35	0.702	12.68	0.710	12.84
0.667	11.88	0.691	12.26	0.666	11.97	0.682	12.29	0.690	12.47
0.647	11.48	0.671	11.98	0.646	11.63	0.662	11.93	0.670	12.05
0.627	11.17	0.651	11.58	0.626	11.25	0.642	11.61	0.650	11.66
0.607	10.77	0.631	11.15	0.606	10.85	0.622	11.19	0.630	11.31
0.587	10.46	0.611	10.87	0.586	10.50	0.602	10.88	0.610	10.92
0.566	10.07	0.591	10.46	0.566	10.14	0.582	10.53	0.590	10.54
0.546	9.67	0.571	10.10	0.546	9.75	0.562	10.14	0.570	10.18
0.526	9.28	0.551	9.76	0.526	9.44	0.542	9.83	0.550	9.81
0.506	8.96	0.531	9.39	0.506	9.06	0.522	9.48	0.530	9.36
0.486	8.57	0.511	9.02	0.486	8.71	0.502	9.09	0.510	9.04
0.466	8.26	0.491	8.69	0.466	8.32	0.482	8.71	0.490	8.65
0.445	7.86	0.471	8.32	0.446	7.94	0.462	8.41	0.470	8.26
0.425	7.55	0.451	7.97	0.426	7.58	0.442	8.00	0.450	7.88
0.405	7.16	0.431	7.57	0.406	7.22	0.422	7.63	0.430	7.55
0.385	6.82	0.411	7.28	0.386	6.90	0.402	7.27	0.410	7.16

0.365	6.45	0.391	6.97	0.366	6.54	0.382	6.87	0.390	6.76
0.345	6.05	0.371	6.60	0.346	6.21	0.362	6.54	0.370	6.42
0.324	5.74	0.351	6.19	0.326	5.82	0.342	6.21	0.350	6.05
0.304	5.36	0.331	5.83	0.306	5.50	0.322	5.87	0.330	5.71
0.284	5.03	0.311	5.51	0.286	5.16	0.302	5.49	0.310	5.34
0.264	4.64	0.291	5.13	0.266	4.80	0.282	5.15	0.290	4.99
0.244	4.32	0.271	4.80	0.246	4.46	0.262	4.81	0.270	4.63
0.224	3.93	0.251	4.40	0.226	4.09	0.242	4.43	0.250	4.30
0.203	3.62	0.231	4.06	0.206	3.73	0.222	4.04	0.230	3.93
0.183	3.30	0.211	3.76	0.186	3.39	0.202	3.72	0.210	3.62
0.163	2.91	0.191	3.36	0.166	3.01	0.182	3.33	0.190	3.24
0.143	2.61	0.171	3.00	0.146	2.62	0.162	2.98	0.170	2.98
0.123	2.24	0.151	2.67	0.126	2.28	0.142	2.59	0.150	2.67
0.103	1.89	0.131	2.28	0.106	1.89	0.122	2.29	0.130	2.36

TABLE S2. Experimental densities of $\{x \text{ CO}_2 + (1-x) \text{ CO}\}$ binary mixtures at $T = 304.21 \text{ K}$

$x = 0.9700$		$x = 0.9810$		$x = 0.9902$		$x = 0.9930$		$x = 0.9960$	
P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$
20.017	851.92	20.045	865.05	20.003	874.50	20.238	879.41	20.115	882.40
19.997	851.76	20.025	864.97	19.983	874.60	20.218	879.42	20.095	882.30
19.977	851.59	20.005	864.89	19.963	874.75	20.198	879.33	20.075	882.10
19.957	851.43	19.985	864.73	19.943	874.75	20.178	879.25	20.055	882.07
19.937	851.27	19.965	864.56	19.923	874.74	20.157	879.14	20.035	881.90
19.917	851.14	19.945	864.40	19.903	874.59	20.137	879.00	20.015	881.80
19.897	851.00	19.925	864.31	19.883	874.50	20.117	878.82	19.995	881.60
19.877	850.83	19.905	864.13	19.863	874.41	20.097	878.67	19.975	881.50
19.857	850.66	19.885	864.02	19.843	874.26	20.077	878.50	19.955	881.30
19.838	850.51	19.865	863.84	19.823	874.18	20.057	878.35	19.935	881.20
19.818	850.40	19.845	863.71	19.803	874.01	20.036	878.23	19.915	881.10
19.798	850.21	19.825	863.60	19.783	873.93	20.016	878.10	19.895	880.90
19.778	850.08	19.805	863.40	19.763	873.77	19.996	877.96	19.875	880.77
19.758	849.87	19.785	863.25	19.744	873.61	19.976	877.82	19.855	880.65
19.738	849.72	19.766	863.08	19.724	873.51	19.956	877.70	19.835	880.50
19.718	849.56	19.746	862.96	19.704	873.36	19.936	877.56	19.815	880.30
19.698	849.42	19.726	862.81	19.684	873.20	19.916	877.39	19.795	880.20
19.678	849.27	19.706	862.63	19.664	873.04	19.895	877.21	19.775	880.00
19.658	849.08	19.686	862.50	19.644	872.87	19.875	877.09	19.755	879.80
19.638	848.92	19.666	862.37	19.624	872.71	19.855	876.97	19.735	879.70
19.618	848.72	19.646	862.24	19.604	872.55	19.835	876.82	19.715	879.51
19.598	848.57	19.626	862.03	19.584	872.38	19.815	876.70	19.695	879.40
19.578	848.40	19.606	861.84	19.564	872.23	19.795	876.56	19.674	879.30
19.559	848.26	19.586	861.77	19.544	872.10	19.774	876.42	19.654	879.10
19.539	848.09	19.566	861.58	19.524	871.97	19.754	876.30	19.634	879.00
19.519	847.91	19.546	861.44	19.504	871.77	19.734	876.16	19.614	878.80
19.499	847.68	19.526	861.31	19.485	871.57	19.714	875.99	19.594	878.60
19.479	847.56	19.506	861.11	19.465	871.40	19.694	875.83	19.574	878.50
19.459	847.36	19.486	860.96	19.445	871.31	19.674	875.67	19.554	878.30

19.439	847.17	19.466	860.81	19.425	871.08	19.653	875.52	19.534	878.10
19.419	846.98	19.446	860.65	19.405	870.96	19.633	875.37	19.514	878.07
19.399	846.79	19.426	860.52	19.385	870.83	19.613	875.19	19.494	877.80
19.379	846.63	19.406	860.36	19.365	870.67	19.593	875.07	19.474	877.67
19.359	846.47	19.386	860.15	19.345	870.51	19.573	874.98	19.454	877.52
19.339	846.24	19.366	859.96	19.325	870.35	19.553	874.82	19.434	877.38
19.319	846.11	19.346	859.85	19.305	870.16	19.533	874.66	19.414	877.20
19.299	845.89	19.326	859.67	19.285	870.02	19.512	874.49	19.394	877.04
19.279	845.73	19.306	859.48	19.265	869.86	19.492	874.34	19.374	876.82
19.260	845.55	19.286	859.34	19.245	869.69	19.472	874.19	19.354	876.70
19.240	845.36	19.266	859.14	19.226	869.53	19.452	874.04	19.334	876.60
19.220	845.18	19.247	858.92	19.206	869.37	19.432	873.87	19.314	876.41
19.200	844.98	19.227	858.82	19.186	869.29	19.412	873.70	19.294	876.30
19.180	844.76	19.207	858.61	19.166	869.11	19.391	873.62	19.274	876.18
19.160	844.65	19.187	858.42	19.146	868.94	19.371	873.47	19.254	876.05
19.140	844.40	19.167	858.23	19.126	868.80	19.351	873.30	19.234	875.90
19.120	844.26	19.147	858.06	19.106	868.69	19.331	873.13	19.214	875.72
19.100	844.10	19.127	857.86	19.086	868.52	19.311	872.97	19.194	875.59
19.080	843.96	19.107	857.63	19.066	868.35	19.291	872.84	19.174	875.40
19.060	843.79	19.087	857.24	19.046	868.23	19.271	872.69	19.154	875.32
19.040	843.60	19.067	857.14	19.026	868.10	19.250	872.45	19.134	875.10
19.020	843.43	19.047	856.98	19.006	867.92	19.230	872.29	19.114	875.00
19.000	843.31	19.027	856.79	18.986	867.73	19.210	872.17	19.094	874.86
18.981	843.12	19.007	856.67	18.967	867.57	19.190	872.02	19.073	874.70
18.961	842.92	18.987	856.53	18.947	867.45	19.170	871.89	19.053	874.50
18.941	842.74	18.967	856.38	18.927	867.26	19.150	871.73	19.033	874.43
18.921	842.59	18.947	856.21	18.907	867.16	19.129	871.56	19.013	874.19
18.901	842.42	18.927	856.06	18.887	866.97	19.109	871.42	18.993	874.10
18.881	842.24	18.907	855.88	18.867	866.82	19.089	871.30	18.973	873.90
18.861	842.10	18.887	855.73	18.847	866.70	19.069	871.14	18.953	873.72
18.841	841.91	18.867	855.59	18.827	866.53	19.049	870.97	18.933	873.60
18.821	841.71	18.847	855.42	18.807	866.35	19.029	870.79	18.913	873.48
18.801	841.53	18.827	855.24	18.787	866.18	19.008	870.62	18.893	873.24

18.781	841.36	18.807	855.11	18.767	866.07	18.988	870.44	18.873	873.20
18.761	841.23	18.787	854.95	18.747	865.88	18.968	870.28	18.853	872.94
18.741	841.02	18.767	854.76	18.727	865.69	18.948	870.11	18.833	872.79
18.721	840.90	18.747	854.62	18.708	865.59	18.928	869.98	18.813	872.63
18.701	840.72	18.727	854.48	18.688	865.40	18.908	869.82	18.793	872.45
18.682	840.49	18.708	854.29	18.668	865.23	18.888	869.58	18.773	872.30
18.662	840.29	18.688	854.12	18.648	865.04	18.867	869.44	18.753	872.20
18.642	840.14	18.668	853.93	18.628	864.95	18.847	869.27	18.733	872.00
18.622	839.95	18.648	853.74	18.608	864.72	18.827	869.10	18.713	871.88
18.602	839.72	18.628	853.63	18.588	864.58	18.807	868.99	18.693	871.70
18.582	839.53	18.608	853.44	18.568	864.39	18.787	868.84	18.673	871.47
18.562	839.35	18.588	853.25	18.548	864.25	18.767	868.68	18.653	871.40
18.542	839.18	18.568	853.06	18.528	864.09	18.746	868.51	18.633	871.18
18.522	839.01	18.548	852.96	18.508	863.90	18.726	868.34	18.613	871.00
18.502	838.80	18.528	852.76	18.488	863.71	18.706	868.17	18.593	870.90
18.482	838.56	18.508	852.58	18.468	863.60	18.686	867.99	18.573	870.64
18.462	838.46	18.488	852.39	18.449	863.39	18.666	867.81	18.553	870.58
18.442	838.23	18.468	852.23	18.429	863.23	18.646	867.68	18.533	870.39
18.422	838.02	18.448	852.09	18.409	863.08	18.626	867.50	18.513	870.11
18.403	837.79	18.428	851.90	18.389	862.90	18.605	867.31	18.493	870.03
18.383	837.64	18.408	851.71	18.369	862.73	18.585	867.17	18.473	869.84
18.363	837.42	18.388	851.52	18.349	862.52	18.565	866.98	18.452	869.70
18.343	837.26	18.368	851.32	18.329	862.40	18.545	866.81	18.432	869.56
18.323	837.04	18.348	851.13	18.309	862.20	18.525	866.66	18.412	869.37
18.303	836.80	18.328	851.02	18.289	862.02	18.505	866.52	18.392	869.20
18.283	836.63	18.308	850.82	18.269	861.90	18.484	866.34	18.372	868.99
18.263	836.38	18.288	850.61	18.249	861.71	18.464	866.15	18.352	868.82
18.243	836.22	18.268	850.46	18.229	861.52	18.444	865.95	18.332	868.74
18.223	836.00	18.248	850.29	18.209	861.32	18.424	865.79	18.312	868.49
18.203	835.80	18.228	850.09	18.190	861.20	18.404	865.65	18.292	868.30
18.183	835.62	18.208	849.96	18.170	861.01	18.384	865.48	18.272	868.20
18.163	835.46	18.188	849.74	18.150	860.81	18.363	865.28	18.252	867.99
18.143	835.21	18.169	849.55	18.130	860.64	18.343	865.12	18.232	867.89

18.124	834.97	18.149	849.40	18.110	860.52	18.323	864.98	18.212	867.67
18.104	834.79	18.129	849.23	18.090	860.32	18.303	864.74	18.192	867.47
18.084	834.64	18.109	849.02	18.070	860.15	18.283	864.53	18.172	867.30
18.064	834.43	18.089	848.82	18.050	859.96	18.263	864.42	18.152	867.11
18.044	834.23	18.069	848.60	18.030	859.78	18.243	864.26	18.132	867.00
18.024	834.03	18.049	848.48	18.010	859.59	18.222	864.06	18.112	866.80
18.004	833.83	18.029	848.26	17.990	859.40	18.202	863.89	18.092	866.60
17.984	833.61	18.009	848.09	17.970	859.27	18.182	863.76	18.072	866.50
17.964	833.42	17.989	847.90	17.951	859.10	18.162	863.52	18.052	866.20
17.944	833.18	17.969	847.72	17.931	858.91	18.142	863.37	18.032	866.10
17.924	833.02	17.949	847.54	17.911	858.71	18.122	863.28	18.012	865.90
17.904	832.85	17.929	847.36	17.891	858.54	18.101	863.04	17.992	865.70
17.884	832.60	17.909	847.17	17.871	858.36	18.081	862.83	17.972	865.58
17.864	832.42	17.889	846.96	17.851	858.16	18.061	862.66	17.952	865.37
17.844	832.18	17.869	846.82	17.831	857.96	18.041	862.53	17.932	865.20
17.825	831.99	17.849	846.62	17.811	857.78	18.021	862.34	17.912	865.03
17.805	831.79	17.829	846.41	17.791	857.64	18.001	862.14	17.892	864.80
17.785	831.61	17.809	846.19	17.771	857.44	17.981	862.04	17.872	864.67
17.765	831.41	17.789	846.05	17.751	857.24	17.960	861.85	17.851	864.41
17.745	831.18	17.769	845.82	17.731	857.12	17.940	861.65	17.831	864.30
17.725	830.98	17.749	845.68	17.711	856.90	17.920	861.45	17.811	864.13
17.705	830.80	17.729	845.45	17.692	856.71	17.900	861.25	17.791	863.93
17.685	830.58	17.709	845.31	17.672	856.57	17.880	861.15	17.771	863.83
17.665	830.40	17.689	845.09	17.652	856.35	17.860	860.95	17.751	863.61
17.645	830.20	17.669	844.93	17.632	856.15	17.839	860.75	17.731	863.50
17.625	829.99	17.650	844.73	17.612	855.99	17.819	860.54	17.711	863.27
17.605	829.78	17.630	844.59	17.592	855.82	17.799	860.42	17.691	863.06
17.585	829.55	17.610	844.37	17.572	855.61	17.779	860.15	17.671	862.94
17.565	829.37	17.590	844.16	17.552	855.46	17.759	859.97	17.651	862.71
17.546	829.18	17.570	843.94	17.532	855.25	17.739	859.87	17.631	862.59
17.526	828.92	17.550	843.79	17.512	855.04	17.718	859.70	17.611	862.38
17.506	828.73	17.530	843.60	17.492	854.85	17.698	859.49	17.591	862.14
17.486	828.52	17.510	843.39	17.472	854.70	17.678	859.29	17.571	862.00

17.466	828.32	17.490	843.18	17.452	854.47	17.658	859.08	17.551	861.80
17.446	828.12	17.470	842.95	17.433	854.33	17.638	858.95	17.531	861.67
17.426	827.91	17.450	842.78	17.413	854.15	17.618	858.73	17.511	861.43
17.406	827.70	17.430	842.63	17.393	853.94	17.598	858.54	17.491	861.20
17.386	827.50	17.410	842.41	17.373	853.79	17.577	858.39	17.471	861.10
17.366	827.30	17.390	842.17	17.353	853.57	17.557	858.18	17.451	860.81
17.346	827.06	17.370	842.02	17.333	853.40	17.537	858.03	17.431	860.76
17.326	826.82	17.350	841.79	17.313	853.13	17.517	857.82	17.411	860.52
17.306	826.64	17.330	841.61	17.293	852.99	17.497	857.60	17.391	860.30
17.286	826.43	17.310	841.44	17.273	852.82	17.477	857.41	17.371	860.20
17.267	826.22	17.290	841.24	17.253	852.64	17.456	857.25	17.351	859.98
17.247	826.02	17.270	841.04	17.233	852.42	17.436	857.10	17.331	859.80
17.227	825.81	17.250	840.82	17.213	852.27	17.416	856.93	17.311	859.60
17.207	825.62	17.230	840.59	17.193	852.05	17.396	856.71	17.291	859.48
17.187	825.37	17.210	840.42	17.174	851.91	17.376	856.54	17.271	859.22
17.167	825.19	17.190	840.28	17.154	851.66	17.356	856.38	17.251	859.00
17.147	824.94	17.170	840.05	17.134	851.43	17.336	856.08	17.230	858.90
17.127	824.74	17.150	839.85	17.114	851.30	17.315	855.87	17.210	858.65
17.107	824.50	17.130	839.63	17.094	851.11	17.295	855.75	17.190	858.57
17.087	824.28	17.111	839.47	17.074	850.90	17.275	855.59	17.170	858.30
17.067	824.09	17.091	839.23	17.054	850.73	17.255	855.38	17.150	858.10
17.047	823.85	17.071	839.04	17.034	850.51	17.235	855.21	17.130	857.94
17.027	823.63	17.051	838.83	17.014	850.36	17.215	855.01	17.110	857.70
17.007	823.46	17.031	838.63	16.994	850.16	17.194	854.83	17.090	857.57
16.987	823.22	17.011	838.42	16.974	849.96	17.174	854.64	17.070	857.30
16.968	823.00	16.991	838.26	16.954	849.74	17.154	854.42	17.050	857.22
16.948	822.80	16.971	838.01	16.934	849.57	17.134	854.20	17.030	857.00
16.928	822.57	16.951	837.82	16.915	849.35	17.114	854.01	17.010	856.80
16.908	822.36	16.931	837.58	16.895	849.19	17.094	853.87	16.990	856.67
16.888	822.14	16.911	837.40	16.875	848.97	17.073	853.71	16.970	856.41
16.868	821.94	16.891	837.22	16.855	848.82	17.053	853.48	16.950	856.30
16.848	821.71	16.871	836.97	16.835	848.57	17.033	853.25	16.930	856.05
16.828	821.49	16.851	836.82	16.815	848.41	17.013	853.09	16.910	855.90

16.808	821.27	16.831	836.58	16.795	848.17	16.993	852.92	16.890	855.70
16.788	820.98	16.811	836.43	16.775	848.02	16.973	852.75	16.870	855.50
16.768	820.78	16.791	836.17	16.755	847.83	16.953	852.54	16.850	855.30
16.748	820.60	16.771	836.00	16.735	847.64	16.932	852.36	16.830	855.09
16.728	820.36	16.751	835.78	16.715	847.43	16.912	852.06	16.810	854.94
16.708	820.13	16.731	835.57	16.695	847.18	16.892	851.87	16.790	854.76
16.689	819.88	16.711	835.34	16.675	847.01	16.872	851.76	16.770	854.57
16.669	819.70	16.691	835.16	16.656	846.82	16.852	851.52	16.750	854.30
16.649	819.50	16.671	834.91	16.636	846.63	16.832	851.29	16.730	854.12
16.629	819.28	16.651	834.73	16.616	846.42	16.811	851.08	16.710	853.98
16.609	819.03	16.631	834.53	16.596	846.24	16.791	850.93	16.690	853.70
16.589	818.82	16.611	834.31	16.576	846.01	16.771	850.70	16.670	853.59
16.569	818.59	16.591	834.09	16.556	845.85	16.751	850.56	16.650	853.39
16.549	818.35	16.572	833.91	16.536	845.62	16.731	850.34	16.629	853.20
16.529	818.09	16.552	833.65	16.516	845.48	16.711	850.15	16.609	852.96
16.509	817.92	16.532	833.47	16.496	845.24	16.691	849.95	16.589	852.80
16.489	817.67	16.512	833.26	16.476	845.01	16.670	849.75	16.569	852.60
16.469	817.44	16.492	833.06	16.456	844.81	16.650	849.57	16.549	852.40
16.449	817.22	16.472	832.80	16.436	844.64	16.630	849.40	16.529	852.26
16.429	817.00	16.452	832.62	16.416	844.42	16.610	849.17	16.509	851.90
16.409	816.70	16.432	832.43	16.397	844.27	16.590	848.93	16.489	851.81
16.390	816.52	16.412	832.18	16.377	844.05	16.570	848.71	16.469	851.57
16.370	816.27	16.392	832.00	16.357	843.84	16.549	848.55	16.449	851.50
16.350	816.07	16.372	831.78	16.337	843.64	16.529	848.36	16.429	851.43
16.330	815.85	16.352	831.54	16.317	843.44	16.509	848.16	16.409	851.16
16.310	815.63	16.332	831.34	16.297	843.23	16.489	847.93	16.389	850.97
16.290	815.39	16.312	831.13	16.277	843.10	16.469	847.67	16.369	850.84
16.270	815.15	16.292	830.91	16.257	842.80	16.449	847.55	16.349	850.66
16.250	814.91	16.272	830.67	16.237	842.68	16.428	847.26	16.329	850.51
16.230	814.69	16.252	830.47	16.217	842.46	16.408	847.10	16.309	850.30
16.210	814.43	16.232	830.27	16.197	842.24	16.388	846.90	16.289	850.14
16.190	814.25	16.212	830.07	16.177	842.07	16.368	846.74	16.269	849.95
16.170	813.99	16.192	829.79	16.157	841.79	16.348	846.55	16.249	849.72

16.150	813.72	16.172	829.62	16.138	841.66	16.328	846.32	16.229	849.60
16.130	813.49	16.152	829.35	16.118	841.46	16.308	846.13	16.209	849.38
16.111	813.28	16.132	829.17	16.098	841.22	16.287	845.90	16.189	849.24
16.091	813.03	16.112	828.92	16.078	840.98	16.267	845.72	16.169	849.03
16.071	812.82	16.092	828.72	16.058	840.81	16.247	845.48	16.149	848.87
16.051	812.54	16.072	828.51	16.038	840.60	16.227	845.26	16.129	848.66
16.031	812.29	16.053	828.28	16.018	840.36	16.207	845.10	16.109	848.41
16.011	812.05	16.033	828.06	15.998	840.19	16.187	844.80	16.089	848.28
15.991	811.85	16.013	827.80	15.978	840.00	16.166	844.63	16.069	848.08
15.971	811.62	15.993	827.61	15.958	839.76	16.146	844.45	16.049	847.93
15.951	811.36	15.973	827.38	15.938	839.52	16.126	844.25	16.029	847.71
15.931	811.08	15.953	827.13	15.918	839.36	16.106	843.99	16.008	847.54
15.911	810.86	15.933	826.95	15.899	839.12	16.086	843.82	15.988	847.35
15.891	810.62	15.913	826.72	15.879	838.94	16.066	843.55	15.968	847.11
15.871	810.38	15.893	826.48	15.859	838.66	16.046	843.36	15.948	846.98
15.851	810.13	15.873	826.24	15.839	838.44	16.025	843.20	15.928	846.74
15.832	809.87	15.853	826.03	15.819	838.25	16.005	842.92	15.908	846.55
15.812	809.61	15.833	825.80	15.799	838.01	15.985	842.75	15.888	846.38
15.792	809.37	15.813	825.50	15.779	837.79	15.965	842.56	15.868	846.14
15.772	809.12	15.793	825.30	15.759	837.62	15.945	842.31	15.848	845.90
15.752	808.91	15.773	825.10	15.739	837.32	15.925	842.13	15.828	845.68
15.732	808.66	15.753	824.85	15.719	837.12	15.904	841.92	15.808	845.52
15.712	808.46	15.733	824.60	15.699	836.91	15.884	841.71	15.788	845.34
15.692	808.14	15.713	824.36	15.679	836.69	15.864	841.46	15.768	845.15
15.672	807.89	15.693	824.12	15.659	836.45	15.844	841.29	15.748	844.90
15.652	807.67	15.673	823.95	15.640	836.24	15.824	841.09	15.728	844.77
15.632	807.40	15.653	823.70	15.620	836.03	15.804	840.85	15.708	844.53
15.612	807.15	15.633	823.46	15.600	835.79	15.783	840.67	15.688	844.35
15.592	806.87	15.613	823.23	15.580	835.54	15.763	840.39	15.668	844.15
15.572	806.64	15.593	822.97	15.560	835.34	15.743	840.21	15.648	843.92
15.552	806.41	15.573	822.75	15.540	835.10	15.723	840.02	15.628	843.70
15.533	806.13	15.553	822.48	15.520	834.92	15.703	839.79	15.608	843.50
15.513	805.87	15.533	822.25	15.500	834.65	15.683	839.57	15.588	843.33

15.493	805.64	15.514	822.04	15.480	834.44	15.663	839.34	15.568	843.11
15.473	805.36	15.494	821.81	15.460	834.24	15.642	839.13	15.548	842.89
15.453	805.13	15.474	821.57	15.440	834.04	15.622	838.86	15.528	842.71
15.433	804.90	15.454	821.31	15.420	833.77	15.602	838.67	15.508	842.53
15.413	804.62	15.434	821.07	15.400	833.57	15.582	838.45	15.488	842.30
15.393	804.37	15.414	820.85	15.381	833.31	15.562	838.27	15.468	842.14
15.373	804.09	15.394	820.64	15.361	833.14	15.542	837.98	15.448	841.90
15.353	803.86	15.374	820.36	15.341	832.87	15.521	837.86	15.428	841.72
15.333	803.57	15.354	820.11	15.321	832.67	15.501	837.57	15.407	841.49
15.313	803.33	15.334	819.91	15.301	832.42	15.481	837.35	15.387	841.26
15.293	803.08	15.314	819.65	15.281	832.23	15.461	837.15	15.367	841.06
15.273	802.85	15.294	819.46	15.261	831.98	15.441	836.93	15.347	840.90
15.254	802.54	15.274	819.18	15.241	831.74	15.421	836.71	15.327	840.66
15.234	802.27	15.254	818.96	15.221	831.51	15.401	836.47	15.307	840.42
15.214	802.07	15.234	818.67	15.201	831.35	15.380	836.21	15.287	840.17
15.194	801.77	15.214	818.47	15.181	831.05	15.360	836.03	15.267	840.00
15.174	801.53	15.194	818.18	15.161	830.85	15.340	835.74	15.247	839.74
15.154	801.24	15.174	817.99	15.141	830.61	15.320	835.58	15.227	839.54
15.134	800.98	15.154	817.67	15.122	830.37	15.300	835.37	15.207	839.31
15.114	800.74	15.134	817.47	15.102	830.13	15.280	835.12	15.187	839.07
15.094	800.48	15.114	817.18	15.082	829.93	15.259	834.90	15.167	838.87
15.074	800.20	15.094	816.97	15.062	829.69	15.239	834.69	15.147	838.61
15.054	799.92	15.074	816.75	15.042	829.47	15.219	834.42	15.127	838.43
15.034	799.66	15.054	816.44	15.022	829.22	15.199	834.21	15.107	838.23
15.014	799.41	15.034	816.26	15.002	829.00	15.179	833.98	15.087	837.97
14.994	799.09	15.014	815.99	14.982	828.79	15.159	833.75	15.067	837.75
14.975	798.84	14.994	815.74	14.962	828.57	15.138	833.54	15.047	837.61
14.955	798.58	14.975	815.46	14.942	828.30	15.118	833.31	15.027	837.30
14.935	798.32	14.955	815.23	14.922	828.06	15.098	833.08	15.007	837.15
14.915	798.03	14.935	814.98	14.902	827.83	15.078	832.85	14.987	836.88
14.895	797.78	14.915	814.73	14.882	827.59	15.058	832.61	14.967	836.67
14.875	797.49	14.895	814.45	14.863	827.36	15.038	832.37	14.947	836.39
14.855	797.21	14.875	814.24	14.843	827.10	15.018	832.15	14.927	836.25

14.835	796.92	14.855	813.99	14.823	826.87	14.997	831.84	14.907	836.03
14.815	796.64	14.835	813.69	14.803	826.61	14.977	831.68	14.887	835.76
14.795	796.42	14.815	813.46	14.783	826.37	14.957	831.44	14.867	835.54
14.775	796.06	14.795	813.18	14.763	826.18	14.937	831.19	14.847	835.29
14.755	795.82	14.775	812.92	14.743	825.94	14.917	830.95	14.827	835.05
14.735	795.56	14.755	812.65	14.723	825.71	14.897	830.72	14.807	834.80
14.715	795.25	14.735	812.44	14.703	825.39	14.876	830.48	14.786	834.60
14.695	794.97	14.715	812.15	14.683	825.19	14.856	830.24	14.766	834.40
14.676	794.69	14.695	811.87	14.663	824.93	14.836	829.99	14.746	834.15
14.656	794.43	14.675	811.62	14.643	824.74	14.816	829.76	14.726	833.91
14.636	794.11	14.655	811.38	14.623	824.50	14.796	829.52	14.706	833.70
14.616	793.87	14.635	811.09	14.604	824.19	14.776	829.34	14.686	833.50
14.596	793.60	14.615	810.88	14.584	823.97	14.756	829.06	14.666	833.25
14.576	793.30	14.595	810.62	14.564	823.69	14.735	828.78	14.646	833.00
14.556	793.05	14.575	810.32	14.544	823.43	14.715	828.60	14.626	832.80
14.536	792.73	14.555	810.07	14.524	823.23	14.695	828.36	14.606	832.51
14.516	792.47	14.535	809.78	14.504	822.97	14.675	828.13	14.586	832.31
14.496	792.18	14.515	809.56	14.484	822.70	14.655	827.89	14.566	832.08
14.476	791.87	14.495	809.26	14.464	822.42	14.635	827.66	14.546	831.86
14.456	791.57	14.475	809.03	14.444	822.22	14.614	827.38	14.526	831.55
14.436	791.31	14.456	808.75	14.424	821.98	14.594	827.14	14.506	831.34
14.416	791.01	14.436	808.52	14.404	821.71	14.574	826.87	14.486	831.12
14.397	790.73	14.416	808.20	14.384	821.48	14.554	826.65	14.466	830.86
14.377	790.44	14.396	807.96	14.364	821.21	14.534	826.38	14.446	830.61
14.357	790.16	14.376	807.68	14.345	820.92	14.514	826.17	14.426	830.40
14.337	789.89	14.356	807.39	14.325	820.69	14.493	825.91	14.406	830.18
14.317	789.57	14.336	807.14	14.305	820.43	14.473	825.71	14.386	829.93
14.297	789.28	14.316	806.84	14.285	820.17	14.453	825.42	14.366	829.71
14.277	788.97	14.296	806.61	14.265	819.96	14.433	825.17	14.346	829.39
14.257	788.68	14.276	806.36	14.245	819.64	14.413	824.91	14.326	829.22
14.237	788.42	14.256	806.19	14.225	819.39	14.393	824.66	14.306	828.95
14.217	788.09	14.236	806.01	14.205	819.14	14.373	824.42	14.286	828.69
14.197	787.77	14.216	805.83	14.185	818.92	14.352	824.22	14.266	828.42

14.177	787.51	14.196	805.60	14.165	818.61	14.332	823.92	14.246	828.22
14.157	787.22	14.176	805.31	14.145	818.37	14.312	823.66	14.226	827.99
14.137	786.89	14.156	805.05	14.125	818.12	14.292	823.41	14.206	827.70
14.117	786.62	14.136	804.85	14.105	817.86	14.272	823.15	14.185	827.48
14.098	786.29	14.116	804.54	14.086	817.57	14.252	822.90	14.165	827.15
14.078	786.01	14.096	804.23	14.066	817.33	14.231	822.63	14.145	826.98
14.058	785.70	14.076	804.03	14.046	817.03	14.211	822.38	14.125	826.67
14.038	785.39	14.056	803.79	14.026	816.76	14.191	822.12	14.105	826.50
14.018	785.11	14.036	803.49	14.006	816.55	14.171	821.93	14.085	826.23
13.998	784.74	14.016	803.15	13.986	816.25	14.151	821.64	14.065	825.95
13.978	784.46	13.996	802.74	13.966	816.01	14.131	821.37	14.045	825.76
13.958	784.15	13.976	802.33	13.946	815.69	14.111	821.10	14.025	825.42
13.938	783.84	13.956	802.02	13.926	815.46	14.090	820.84	14.005	825.23
13.918	783.50	13.936	801.79	13.906	815.20	14.070	820.59	13.985	824.96
13.898	783.19	13.917	801.55	13.886	814.94	14.050	820.31	13.965	824.69
13.878	782.86	13.897	801.28	13.866	814.66	14.030	820.07	13.945	824.43
13.858	782.57	13.877	801.06	13.847	814.41	14.010	819.80	13.925	824.17
13.838	782.22	13.857	800.77	13.827	814.15	13.990	819.55	13.905	823.90
13.819	781.88	13.837	800.49	13.807	813.84	13.969	819.29	13.885	823.67
13.799	781.63	13.817	800.27	13.787	813.56	13.949	819.04	13.865	823.40
13.779	781.23	13.797	800.00	13.767	813.31	13.929	818.77	13.845	823.12
13.759	780.93	13.777	799.74	13.747	813.03	13.909	818.48	13.825	822.87
13.739	780.66	13.757	799.48	13.727	812.75	13.889	818.25	13.805	822.66
13.719	780.33	13.737	799.18	13.707	812.50	13.869	817.91	13.785	822.36
13.699	780.02	13.717	798.90	13.687	812.22	13.848	817.70	13.765	822.19
13.679	779.68	13.697	798.59	13.667	811.97	13.828	817.43	13.745	821.83
13.659	779.36	13.677	798.41	13.647	811.75	13.808	817.15	13.725	821.63
13.639	779.03	13.657	798.12	13.627	811.44	13.788	816.87	13.705	821.35
13.619	778.72	13.637	797.83	13.607	811.14	13.768	816.65	13.685	821.06
13.599	778.39	13.617	797.59	13.588	810.86	13.748	816.30	13.665	820.86
13.579	778.05	13.597	797.28	13.568	810.62	13.728	816.10	13.645	820.54
13.559	777.73	13.577	796.95	13.548	810.34	13.707	815.81	13.625	820.22
13.540	777.40	13.557	796.64	13.528	810.05	13.687	815.51	13.605	820.01

13.520	777.07	13.537	796.41	13.508	809.82	13.667	815.24	13.585	819.71
13.500	776.75	13.517	796.15	13.488	809.48	13.647	814.98	13.564	819.41
13.480	776.42	13.497	795.81	13.468	809.22	13.627	814.66	13.544	819.13
13.460	776.09	13.477	795.53	13.448	808.91	13.607	814.44	13.524	818.92
13.440	775.74	13.457	795.21	13.428	808.66	13.586	814.15	13.504	818.63
13.420	775.42	13.437	794.95	13.408	808.37	13.566	813.88	13.484	818.36
13.400	775.03	13.417	794.65	13.388	808.08	13.546	813.59	13.464	818.14
13.380	774.69	13.398	794.33	13.368	807.80	13.526	813.34	13.444	817.84
13.360	774.38	13.378	794.08	13.348	807.54	13.506	813.02	13.424	817.58
13.340	773.98	13.358	793.78	13.329	807.24	13.486	812.76	13.404	817.30
13.320	773.70	13.338	793.45	13.309	806.93	13.466	812.47	13.384	816.97
13.300	773.36	13.318	793.20	13.289	806.65	13.445	812.20	13.364	816.66
13.280	773.00	13.298	792.87	13.269	806.34	13.425	811.94	13.344	816.44
13.260	772.67	13.278	792.55	13.249	806.05	13.405	811.57	13.324	816.18
13.241	772.31	13.258	792.29	13.229	805.79	13.385	811.28	13.304	815.93
13.221	772.00	13.238	791.95	13.209	805.51	13.365	811.06	13.284	815.56
13.201	771.61	13.218	791.68	13.189	805.17	13.345	810.77	13.264	815.33
13.181	771.28	13.198	791.32	13.169	804.91	13.324	810.52	13.244	815.10
13.161	770.91	13.178	791.06	13.149	804.56	13.304	810.18	13.224	814.71
13.141	770.63	13.158	790.73	13.129	804.29	13.284	809.91	13.204	814.49
13.121	770.23	13.138	790.41	13.109	804.01	13.264	809.65	13.184	814.17
13.101	769.89	13.118	790.13	13.089	803.69	13.244	809.29	13.164	813.92
13.081	769.51	13.098	789.77	13.070	803.38	13.224	809.06	13.144	813.69
13.061	769.16	13.078	789.49	13.050	803.04	13.203	808.76	13.124	813.34
13.041	768.83	13.058	789.13	13.030	802.77	13.183	808.42	13.104	813.05
13.021	768.41	13.038	788.82	13.010	802.47	13.163	808.19	13.084	812.81
13.001	768.12	13.018	788.55	12.990	802.13	13.143	807.90	13.064	812.49
12.981	767.70	12.998	788.11	12.970	801.81	13.123	807.59	13.044	812.21
12.962	767.37	12.978	787.87	12.950	801.54	13.103	807.30	13.024	811.93
12.942	767.03	12.958	787.49	12.930	801.24	13.083	806.99	13.004	811.61
12.922	766.62	12.938	787.22	12.910	800.92	13.062	806.72	12.984	811.30
12.902	766.29	12.918	786.84	12.890	800.67	13.042	806.44	12.963	811.08
12.882	765.91	12.898	786.57	12.870	800.34	13.022	806.08	12.943	810.75

12.862	765.53	12.878	786.19	12.850	799.98	13.002	805.79	12.923	810.49
12.842	765.17	12.859	785.86	12.830	799.67	12.982	805.49	12.903	810.23
12.822	764.77	12.839	785.56	12.811	799.37	12.962	805.18	12.883	809.84
12.802	764.43	12.819	785.18	12.791	799.09	12.941	804.92	12.863	809.61
12.782	764.03	12.799	784.88	12.771	798.78	12.921	804.65	12.843	809.28
12.762	763.62	12.779	784.58	12.751	798.46	12.901	804.32	12.823	808.95
12.742	763.30	12.759	784.18	12.731	798.14	12.881	804.01	12.803	808.72
12.722	762.89	12.739	783.84	12.711	797.81	12.861	803.67	12.783	808.38
12.702	762.49	12.719	783.53	12.691	797.48	12.841	803.40	12.763	808.08
12.683	762.16	12.699	783.19	12.671	797.21	12.821	803.07	12.743	807.80
12.663	761.75	12.679	782.90	12.651	796.85	12.800	802.77	12.723	807.53
12.643	761.34	12.659	782.49	12.631	796.50	12.780	802.45	12.703	807.16
12.623	760.99	12.639	782.14	12.611	796.25	12.760	802.14	12.683	806.91
12.603	760.59	12.619	781.83	12.591	795.93	12.740	801.85	12.663	806.58
12.583	760.18	12.599	781.44	12.571	795.58	12.720	801.52	12.643	806.23
12.563	759.79	12.579	781.09	12.552	795.26	12.700	801.19	12.623	805.96
12.543	759.41	12.559	780.74	12.532	794.96	12.679	800.86	12.603	805.65
12.523	759.02	12.539	780.41	12.512	794.65	12.659	800.55	12.583	805.30
12.503	758.65	12.519	780.01	12.492	794.26	12.639	800.25	12.563	805.05
12.483	758.20	12.499	779.74	12.472	793.97	12.619	799.95	12.543	804.82
12.463	757.80	12.479	779.35	12.452	793.65	12.599	799.58	12.523	804.49
12.443	757.41	12.459	778.97	12.432	793.32	12.579	799.27	12.503	804.11
12.423	757.02	12.439	778.60	12.412	792.98	12.558	798.90	12.483	803.84
12.403	756.58	12.419	778.24	12.392	792.66	12.538	798.62	12.463	803.56
12.384	756.20	12.399	777.89	12.372	792.26	12.518	798.33	12.443	803.16
12.364	755.72	12.379	777.57	12.352	791.99	12.498	797.94	12.423	802.86
12.344	755.37	12.359	777.20	12.332	791.66	12.478	797.66	12.403	802.55
12.324	754.99	12.339	776.84	12.312	791.28	12.458	797.29	12.383	802.20
12.304	754.51	12.320	776.45	12.293	790.96	12.438	796.97	12.362	801.91
12.284	754.09	12.300	776.15	12.273	790.63	12.417	796.66	12.342	801.61
12.264	753.68	12.280	775.70	12.253	790.30	12.397	796.30	12.322	801.30
12.244	753.27	12.260	775.35	12.233	789.98	12.377	795.95	12.302	800.94
12.224	752.84	12.240	775.00	12.213	789.58	12.357	795.62	12.282	800.67

12.204	752.43	12.220	774.59	12.193	789.24	12.337	795.32	12.262	800.34
12.184	751.95	12.200	774.19	12.173	788.92	12.317	794.91	12.242	799.97
12.164	751.56	12.180	773.88	12.153	788.59	12.296	794.68	12.222	799.61
12.144	751.07	12.160	773.51	12.133	788.44	12.276	794.24	12.202	799.30
12.124	750.67	12.140	773.05	12.113	788.18	12.256	793.96	12.182	798.99
12.105	750.26	12.120	772.73	12.093	787.91	12.236	793.68	12.162	798.70
12.085	749.77	12.100	772.36	12.073	787.59	12.216	793.27	12.142	798.32
12.065	749.41	12.080	771.98	12.053	787.26	12.196	792.95	12.122	798.00
12.045	748.94	12.060	771.58	12.034	786.93	12.176	792.63	12.102	797.75
12.025	748.46	12.040	771.19	12.014	786.64	12.155	792.30	12.082	797.40
12.005	748.02	12.020	770.74	11.994	786.43	12.135	791.93	12.062	797.05
11.985	747.57	12.000	770.40	11.974	786.09	12.115	791.60	12.042	796.68
11.965	747.10	11.980	769.96	11.954	785.71	12.095	791.26	12.022	796.41
11.945	746.70	11.960	769.60	11.934	785.44	12.075	790.92	12.002	796.07
11.925	746.24	11.940	769.21	11.914	785.23	12.055	790.62	11.982	795.66
11.905	745.75	11.920	768.83	11.894	784.92	12.034	790.23	11.962	795.34
11.885	745.32	11.900	768.39	11.874	784.57	12.014	789.99	11.942	795.08
11.865	744.88	11.880	768.03	11.854	784.18	11.994	789.58	11.922	794.70
11.845	744.39	11.860	767.67	11.834	783.90	11.974	789.26	11.902	794.35
11.825	743.94	11.840	767.24	11.814	783.58	11.954	788.93	11.882	794.01
11.806	743.53	11.820	766.79	11.795	783.27	11.934	788.61	11.862	793.69
11.786	743.01	11.801	766.44	11.775	783.00	11.913	788.27	11.842	793.38
11.766	742.55	11.781	765.98	11.755	782.68	11.893	787.86	11.822	792.91
11.746	742.10	11.761	765.62	11.735	782.30	11.873	787.51	11.802	792.62
11.726	741.62	11.741	765.21	11.715	781.97	11.853	787.19	11.782	792.25
11.706	741.13	11.721	764.77	11.695	781.65	11.833	786.81	11.762	791.92
11.686	740.70	11.701	764.32	11.675	781.29	11.813	786.52	11.741	791.59
11.666	740.17	11.681	763.91	11.655	780.89	11.793	786.13	11.721	791.20
11.646	739.68	11.661	763.46	11.635	780.64	11.772	785.75	11.701	790.84
11.626	739.18	11.641	763.11	11.615	780.18	11.752	785.41	11.681	790.50
11.606	738.75	11.621	762.67	11.595	779.89	11.732	785.05	11.661	790.16
11.586	738.23	11.601	762.23	11.575	779.56	11.712	784.71	11.641	789.77
11.566	737.72	11.581	761.78	11.555	779.14	11.692	784.36	11.621	789.40

11.546	737.27	11.561	761.34	11.536	778.88	11.672	783.99	11.601	789.10
11.527	736.79	11.541	760.95	11.516	778.49	11.651	783.62	11.581	788.69
11.507	736.25	11.521	760.45	11.496	778.07	11.631	783.26	11.561	788.39
11.487	735.72	11.501	760.06	11.476	777.78	11.611	782.89	11.541	788.03
11.467	735.23	11.481	759.56	11.456	777.46	11.591	782.49	11.521	787.57
11.447	734.71	11.461	759.16	11.436	776.99	11.571	782.13	11.501	787.20
11.427	734.24	11.441	758.73	11.416	776.66	11.551	781.79	11.481	786.85
11.407	733.76	11.421	758.24	11.396	776.26	11.531	781.41	11.461	786.53
11.387	733.23	11.401	757.86	11.376	775.91	11.510	781.02	11.441	786.10
11.367	732.70	11.381	757.42	11.356	775.55	11.490	780.63	11.421	785.77
11.347	732.22	11.361	756.97	11.336	775.17	11.470	780.25	11.401	785.40
11.327	731.69	11.341	756.48	11.316	774.81	11.450	779.95	11.381	785.04
11.307	731.19	11.321	756.01	11.296	774.42	11.430	779.55	11.361	784.60
11.287	730.63	11.301	755.56	11.277	773.99	11.410	779.14	11.341	784.24
11.267	730.14	11.281	755.07	11.257	773.62	11.389	778.75	11.321	783.91
11.248	729.59	11.262	754.65	11.237	773.27	11.369	778.38	11.301	783.48
11.228	729.04	11.242	754.16	11.217	772.87	11.349	777.99	11.281	783.13
11.208	728.53	11.222	753.72	11.197	772.46	11.329	777.59	11.261	782.68
11.188	727.99	11.202	753.24	11.177	772.08	11.309	777.20	11.241	782.30
11.168	727.39	11.182	752.79	11.157	771.66	11.289	776.74	11.221	781.95
11.148	726.80	11.162	752.27	11.137	771.24	11.268	776.41	11.201	781.49
11.128	726.23	11.142	751.77	11.117	770.81	11.248	776.00	11.181	781.13
11.108	725.69	11.122	751.31	11.097	770.46	11.228	775.58	11.161	780.80
11.088	725.09	11.102	750.85	11.077	770.04	11.208	775.18	11.140	780.44
11.068	724.52	11.082	750.40	11.057	769.57	11.188	774.73	11.120	780.03
11.048	723.94	11.062	749.93	11.037	769.18	11.168	774.34	11.100	779.59
11.028	723.38	11.042	749.38	11.018	768.82	11.148	773.91	11.080	779.20
11.008	722.87	11.022	748.90	10.998	768.43	11.127	773.54	11.060	778.79
10.988	722.24	11.002	748.39	10.978	767.99	11.107	773.11	11.040	778.34
10.968	721.64	10.982	747.91	10.958	767.52	11.087	772.72	11.020	777.90
10.949	721.10	10.962	747.41	10.938	767.13	11.067	772.25	11.000	777.54
10.929	720.52	10.942	746.89	10.918	766.69	11.047	771.83	10.980	777.10
10.909	719.91	10.922	746.36	10.898	766.27	11.027	771.43	10.960	776.71

10.889	719.33	10.902	745.88	10.878	765.80	11.006	770.96	10.940	776.29
10.869	718.71	10.882	745.39	10.858	765.38	10.986	770.53	10.920	775.86
10.849	718.13	10.862	744.88	10.838	764.95	10.966	770.08	10.900	775.50
10.829	717.57	10.842	744.37	10.818	764.52	10.946	769.66	10.880	775.07
10.809	716.95	10.822	743.86	10.798	763.98	10.926	769.22	10.860	774.65
10.789	716.34	10.802	743.33	10.778	763.61	10.906	768.84	10.840	774.21
10.769	715.68	10.782	742.79	10.759	763.09	10.886	768.37	10.820	773.84
10.749	715.08	10.762	742.30	10.739	762.63	10.865	767.89	10.800	773.38
10.729	714.44	10.742	741.77	10.719	762.24	10.845	767.47	10.780	772.92
10.709	713.78	10.723	741.23	10.699	761.77	10.825	766.99	10.760	772.55
10.689	713.10	10.703	740.72	10.679	761.28	10.805	766.53	10.740	772.10
10.670	712.45	10.683	740.20	10.659	760.80	10.785	766.02	10.720	771.63
10.650	711.82	10.663	739.59	10.639	760.38	10.765	765.52	10.700	771.20
10.630	711.12	10.643	739.08	10.619	759.80	10.744	765.10	10.680	770.75
10.610	710.50	10.623	738.52	10.599	759.42	10.724	764.62	10.660	770.26
10.590	709.78	10.603	738.01	10.579	758.96	10.704	764.12	10.640	769.87
10.570	709.13	10.583	737.42	10.559	758.39	10.684	763.65	10.620	769.46
10.550	708.45	10.563	736.77	10.539	757.90	10.664	763.16	10.600	768.97
10.530	707.82	10.543	736.26	10.519	757.42	10.644	762.67	10.580	768.54
10.510	707.11	10.523	735.72	10.500	756.98	10.623	762.18	10.560	768.09
10.490	706.37	10.503	735.18	10.480	756.48	10.603	761.61	10.540	767.57
10.470	705.66	10.483	734.55	10.460	755.99	10.583	761.18	10.519	767.08
10.450	704.95	10.463	733.97	10.440	755.49	10.563	760.71	10.499	766.64
10.430	704.25	10.443	733.41	10.420	755.02	10.543	760.19	10.479	766.22
10.410	703.59	10.423	732.79	10.400	754.50	10.523	759.65	10.459	765.73
10.391	702.78	10.403	732.18	10.380	753.99	10.503	759.16	10.439	765.29
10.371	702.08	10.383	731.61	10.360	753.40	10.482	758.69	10.419	764.80
10.351	701.32	10.363	730.94	10.340	752.93	10.462	758.14	10.399	764.29
10.331	700.58	10.343	730.33	10.320	752.49	10.442	757.64	10.379	763.79
10.311	699.85	10.323	729.73	10.300	751.88	10.422	757.15	10.359	763.31
10.291	699.07	10.303	729.09	10.280	751.33	10.402	756.59	10.339	762.86
10.271	698.31	10.283	728.56	10.260	750.77	10.382	756.06	10.319	762.40
10.251	697.55	10.263	727.93	10.241	750.22	10.361	755.51	10.299	761.86

10.231	696.82	10.243	727.29	10.221	749.76	10.341	754.99	10.279	761.38
10.211	696.03	10.223	726.67	10.201	749.23	10.321	754.49	10.259	760.92
10.191	695.25	10.204	726.02	10.181	748.67	10.301	753.97	10.239	760.40
10.171	694.49	10.184	725.34	10.161	748.14	10.281	753.41	10.219	759.88
10.151	693.67	10.164	724.64	10.141	747.60	10.261	752.83	10.199	759.38
10.131	692.86	10.144	724.06	10.121	746.98	10.241	752.34	10.179	758.88
10.111	692.08	10.124	723.39	10.101	746.44	10.220	751.76	10.159	758.43
10.092	691.43	10.104	722.72	10.081	745.94	10.200	751.24	10.139	757.98
10.072	690.72	10.084	722.01	10.061	745.35	10.180	750.67	10.119	757.40
10.052	690.09	10.064	721.38	10.041	744.81	10.160	750.13	10.099	756.91
10.032	689.41	10.044	720.67	10.021	744.11	10.140	749.56	10.079	756.41
10.012	688.73	10.024	720.00	10.001	743.59	10.120	749.02	10.059	755.80
9.992	688.04	10.004	719.31	9.982	743.01	10.099	748.40	10.039	755.33
9.972	687.34	9.984	718.61	9.962	742.37	10.079	747.86	10.019	754.84
9.952	686.56	9.964	717.88	9.942	741.86	10.059	747.33	9.999	754.32
9.932	685.83	9.944	717.18	9.922	741.27	10.039	746.77	9.979	753.74
9.912	685.02	9.924	716.52	9.902	740.60	10.019	746.20	9.959	753.17
9.892	684.18	9.904	715.75	9.882	740.01	9.999	745.63	9.939	752.69
9.872	683.44	9.884	714.98	9.862	739.39	9.978	745.03	9.918	752.16
9.852	682.57	9.864	714.24	9.842	738.75	9.958	744.51	9.898	751.59
9.832	681.69	9.844	713.49	9.822	738.18	9.938	743.90	9.878	751.01
9.813	680.86	9.824	712.73	9.802	737.56	9.918	743.35	9.858	750.46
9.793	679.86	9.804	712.05	9.782	736.92	9.898	742.76	9.838	749.93
9.773	678.95	9.784	711.29	9.762	736.34	9.878	742.16	9.818	749.35
9.753	678.07	9.764	710.57	9.743	735.63	9.858	741.53	9.798	748.75
9.733	677.17	9.744	709.74	9.723	734.98	9.837	740.91	9.778	748.22
9.713	676.18	9.724	708.94	9.703	734.29	9.817	740.34	9.758	747.66
9.693	675.17	9.704	708.23	9.683	733.68	9.797	739.72	9.738	747.00
9.673	674.20	9.684	707.45	9.663	733.09	9.777	739.08	9.718	746.50
9.653	673.18	9.665	706.69	9.643	732.37	9.757	738.45	9.698	745.88
9.633	672.09	9.645	705.88	9.623	731.73	9.737	737.84	9.678	745.30
9.613	671.14	9.625	705.06	9.603	731.02	9.716	737.22	9.658	744.68
9.593	669.99	9.605	704.27	9.583	730.34	9.696	736.54	9.638	744.13

9.573	668.93	9.585	703.42	9.563	729.64	9.676	735.88	9.618	743.46
9.553	667.74	9.565	702.61	9.543	728.97	9.656	735.27	9.598	742.88
9.533	666.74	9.545	701.71	9.523	728.28	9.636	734.62	9.578	742.29
9.514	665.56	9.525	700.80	9.503	727.62	9.616	733.94	9.558	741.62
9.494	664.38	9.505	699.98	9.484	726.84	9.596	733.31	9.538	740.97
9.474	663.25	9.485	699.13	9.464	726.14	9.575	732.68	9.518	740.35
9.454	662.08	9.465	698.22	9.444	725.43	9.555	731.93	9.498	739.73
9.434	660.89	9.445	697.35	9.424	724.70	9.535	731.26	9.478	739.11
9.414	659.70	9.425	696.38	9.404	723.95	9.515	730.57	9.458	738.45
9.394	658.50	9.405	695.42	9.384	723.12	9.495	729.90	9.438	737.78
9.374	657.24	9.385	694.51	9.364	722.43	9.475	729.16	9.418	737.15
9.354	655.89	9.365	693.57	9.344	721.70	9.454	728.46	9.398	736.43
9.334	654.60	9.345	692.63	9.324	720.93	9.434	727.72	9.378	735.74
9.314	653.33	9.325	691.67	9.304	720.14	9.414	727.05	9.358	735.06
9.294	652.00	9.305	690.70	9.284	719.39	9.394	726.31	9.338	734.47
9.274	650.58	9.285	689.68	9.264	718.58	9.374	725.58	9.318	733.75
9.254	649.22	9.265	688.71	9.244	717.76	9.354	724.79	9.297	733.04
9.235	647.65	9.245	687.66	9.225	716.92	9.333	724.08	9.277	732.34
9.215	646.26	9.225	686.66	9.205	716.01	9.313	723.30	9.257	731.61
9.195	644.90	9.205	685.63	9.185	715.27	9.293	722.64	9.237	730.96
9.175	643.38	9.185	684.68	9.165	714.41	9.273	721.99	9.217	730.20
9.155	641.71	9.165	683.49	9.145	713.60	9.253	721.35	9.197	729.45
9.135	640.21	9.145	682.47	9.125	712.74	9.233	720.71	9.177	728.77
9.115	638.62	9.126	681.41	9.105	711.85	9.213	720.07	9.157	728.00
9.095	636.90	9.106	680.29	9.085	711.02	9.192	719.31	9.137	727.27
9.075	635.19	9.086	679.23	9.065	710.11	9.172	718.59	9.117	726.54
9.055	633.49	9.066	678.00	9.045	709.19	9.152	717.88	9.097	725.79
9.035	631.75	9.046	676.87	9.025	708.30	9.132	717.15	9.077	724.94
9.015	629.98	9.026	675.65	9.005	707.39	9.112	716.40	9.057	724.08
8.995	628.09	9.006	674.48	8.985	706.41	9.092	715.55	9.037	723.46
8.975	626.17	8.986	673.21	8.966	705.47	9.071	714.84	9.017	722.69
8.956	624.17	8.966	671.96	8.946	704.46	9.051	714.04	8.997	721.87
8.936	622.16	8.946	670.68	8.926	703.64	9.031	713.28	8.977	721.15

8.916	620.19	8.926	669.42	8.906	702.61	9.011	712.43	8.957	720.24
8.896	618.23	8.906	668.10	8.886	701.59	8.991	711.60	8.937	719.45
8.876	616.12	8.886	666.79	8.866	700.63	8.971	710.71	8.917	718.69
8.856	613.83	8.866	665.43	8.846	699.57	8.951	709.91	8.897	717.83
8.836	611.46	8.846	664.10	8.826	698.44	8.930	709.07	8.877	717.00
8.816	609.27	8.826	662.63	8.806	697.45	8.910	708.22	8.857	716.12
8.796	606.77	8.806	661.24	8.786	696.51	8.890	707.35	8.837	715.27
8.776	604.37	8.786	659.73	8.766	695.46	8.870	706.53	8.817	714.40
8.756	601.94	8.766	658.30	8.746	694.38	8.850	705.64	8.797	713.50
8.736	599.30	8.746	656.75	8.726	693.32	8.830	704.72	8.777	712.55
8.716	596.83	8.726	655.16	8.707	692.21	8.809	703.75	8.757	711.72
8.696	593.99	8.706	653.58	8.687	691.13	8.789	702.86	8.737	710.80
8.676	591.27	8.686	652.01	8.667	689.94	8.769	701.93	8.717	709.77
8.657	588.25	8.666	650.29	8.647	688.75	8.749	700.87	8.696	708.78
8.637	585.35	8.646	648.57	8.627	687.56	8.729	699.92	8.676	707.80
8.617	582.23	8.626	646.83	8.607	686.33	8.709	698.96	8.656	706.83
8.597	579.11	8.607	645.00	8.587	685.00	8.688	697.89	8.636	705.91
8.577	575.81	8.587	643.17	8.567	683.78	8.668	696.87	8.616	704.92
8.557	572.53	8.567	641.33	8.547	682.53	8.648	695.80	8.596	703.88
8.537	568.77	8.547	639.35	8.527	681.20	8.628	694.76	8.576	702.74
8.517	564.92	8.527	637.42	8.507	679.83	8.608	693.72	8.556	701.83
8.497	560.80	8.507	635.27	8.487	678.49	8.588	692.56	8.536	700.66
8.477	556.53	8.487	633.39	8.467	676.99	8.568	691.40	8.516	699.58
8.457	552.69	8.467	632.16	8.448	675.58	8.547	690.27	8.496	698.58
8.437	548.40	8.447	630.77	8.428	674.14	8.527	689.12	8.476	697.52
8.417	543.94	8.427	629.19	8.408	672.74	8.507	687.94	8.456	696.40
8.397	538.74	8.407	627.47	8.388	671.33	8.487	686.74	8.436	695.25
8.378	532.82	8.387	625.57	8.368	669.83	8.467	685.47	8.416	694.09
8.358	527.60	8.367	623.44	8.348	668.37	8.447	684.25	8.396	692.92
8.338	521.48	8.347	621.05	8.328	666.91	8.426	682.93	8.376	691.63
8.318	515.68	8.327	618.36	8.308	665.29	8.406	681.57	8.356	690.52
8.298	509.23	8.307	615.49	8.288	663.68	8.386	680.24	8.336	689.26
8.278	502.20	8.287	612.71	8.268	662.07	8.366	679.00	8.316	688.04

8.258	496.85	8.267	609.42	8.248	660.49	8.346	677.43	8.296	686.66
8.238	491.59	8.247	606.24	8.228	658.79	8.326	675.91	8.276	685.32
8.218	484.52	8.227	602.69	8.208	657.02	8.306	674.44	8.256	683.91
8.198	477.95	8.207	598.66	8.189	655.23	8.285	673.00	8.236	682.59
8.178	470.54	8.187	594.96	8.169	653.26	8.265	671.42	8.216	681.16
8.158	463.49	8.167	590.82	8.149	651.41	8.245	669.93	8.196	679.69
8.138	455.33	8.147	585.97	8.129	649.58	8.225	668.36	8.176	678.27
8.118	447.01	8.127	581.06	8.109	647.40	8.205	666.69	8.156	676.67
8.099	438.90	8.107	576.55	8.089	645.24	8.185	664.90	8.136	675.24
8.079	430.58	8.087	571.06	8.069	643.10	8.164	663.23	8.116	673.70
8.059	422.48	8.068	564.93	8.049	640.78	8.144	661.46	8.096	672.04
8.039	414.57	8.048	559.16	8.029	638.56	8.124	659.48	8.075	670.43
8.019	406.58	8.028	552.40	8.009	636.09	8.104	657.71	8.055	668.70
7.999	398.73	8.008	545.43	7.989	633.32	8.084	655.61	8.035	667.07
7.979	391.41	7.988	538.59	7.969	630.53	8.064	653.52	8.015	665.00
7.959	383.73	7.968	529.82	7.949	627.67	8.043	651.46	7.995	663.29
7.939	376.50	7.948	520.98	7.930	624.41	8.023	649.23	7.975	661.20
7.919	369.60	7.928	511.28	7.910	621.34	8.003	646.75	7.955	659.30
7.899	362.08	7.908	502.77	7.890	617.65	7.983	644.39	7.935	657.15
7.879	355.61	7.888	491.62	7.870	614.05	7.963	641.93	7.915	654.73
7.859	349.25	7.868	479.15	7.850	609.26	7.943	639.20	7.895	652.33
7.839	343.44	7.848	468.02	7.830	605.25	7.923	636.47	7.875	649.76
7.819	337.65	7.828	456.19	7.810	599.90	7.902	633.43	7.855	647.40
7.800	332.02	7.808	442.63	7.790	594.70	7.882	630.32	7.835	644.60
7.780	326.85	7.788	430.69	7.770	588.19	7.862	627.12	7.815	641.97
7.760	321.75	7.768	417.06	7.750	581.93	7.842	623.89	7.795	639.40
7.740	317.12	7.748	403.77	7.730	574.53	7.822	620.35	7.775	636.36
7.720	312.43	7.728	391.04	7.710	565.62	7.802	616.65	7.755	633.22
7.700	308.19	7.708	378.68	7.691	555.78	7.781	612.15	7.735	629.83
7.680	304.00	7.688	367.06	7.671	544.46	7.761	607.62	7.715	625.74
7.660	300.07	7.668	357.23	7.651	533.85	7.741	602.14	7.695	622.18
7.640	296.25	7.648	347.81	7.631	517.25	7.721	596.75	7.675	617.98
7.620	292.53	7.628	339.46	7.611	500.09	7.701	590.06	7.655	612.68

7.600	288.89	7.608	331.62	7.591	477.27	7.681	583.24	7.635	606.82
7.580	286.41	7.588	324.71	7.571	452.57	7.661	573.99	7.615	600.44
7.560	283.53	7.568	318.24	7.551	425.96	7.640	564.29	7.595	594.10
7.540	280.58	7.548	312.62	7.531	401.04	7.620	554.34	7.575	587.11
7.521	277.69	7.529	307.35	7.511	379.15	7.600	543.10	7.555	581.40
7.501	274.76	7.509	302.22	7.491	360.29	7.580	526.26	7.535	572.78
7.481	272.02	7.489	297.57	7.471	343.35	7.560	506.75	7.515	561.22
7.461	269.15	7.469	293.23	7.451	331.63	7.540	479.26	7.495	542.76
7.441	266.58	7.449	289.21	7.432	322.27	7.519	450.46	7.474	504.32
7.421	263.86	7.429	285.20	7.412	315.10	7.499	417.77	7.454	458.17
7.401	261.16	7.409	281.73	7.392	308.30	7.479	389.90	7.434	421.52
7.381	258.65	7.389	278.04	7.372	302.35	7.459	362.02	7.414	391.78
7.361	255.98	7.369	274.73	7.352	297.21	7.439	343.08	7.394	368.62
7.341	253.53	7.349	271.54	7.332	292.30	7.419	337.17	7.374	349.20
7.321	251.25	7.329	268.34	7.312	287.56	7.398	331.22	7.354	335.74
7.301	248.95	7.309	265.38	7.292	283.11	7.378	319.03	7.334	325.13
7.281	246.68	7.289	262.56	7.272	279.07	7.358	308.14	7.314	315.68
7.261	244.50	7.269	259.72	7.252	275.01	7.338	300.72	7.294	308.42
7.241	242.52	7.249	257.14	7.232	271.31	7.318	294.49	7.274	301.91
7.222	240.62	7.229	254.51	7.212	267.83	7.298	288.88	7.254	296.13
7.202	238.97	7.209	252.04	7.192	264.56	7.278	283.84	7.234	290.85
7.182	236.99	7.189	249.61	7.173	261.39	7.257	278.67	7.214	285.96
7.162	235.03	7.169	247.21	7.153	258.46	7.237	274.88	7.194	281.57
7.142	233.24	7.149	244.88	7.133	255.59	7.217	271.20	7.174	277.34
7.122	231.40	7.129	242.66	7.113	252.91	7.197	267.60	7.154	273.41
7.102	229.63	7.109	240.45	7.093	250.23	7.177	264.14	7.134	269.86
7.082	227.87	7.089	238.39	7.073	247.61	7.157	260.84	7.114	266.30
7.062	226.37	7.069	236.18	7.053	245.13	7.136	257.70	7.094	262.85
7.042	224.72	7.049	234.21	7.033	242.71	7.116	254.67	7.074	259.86
7.022	223.03	7.029	231.84	7.013	240.37	7.096	251.88	7.054	256.71
7.002	221.44	7.010	229.81	6.993	238.08	7.076	249.10	7.034	253.76
6.982	219.83	6.990	227.90	6.973	235.87	7.056	246.31	7.014	251.03
6.962	218.20	6.970	226.07	6.953	233.73	7.036	243.78	6.994	248.32

6.943	216.63	6.950	224.24	6.933	231.66	7.016	241.34	6.974	245.68
6.923	215.13	6.930	222.55	6.914	229.64	6.995	238.99	6.954	243.11
6.903	213.41	6.910	220.82	6.894	227.48	6.975	236.72	6.934	240.67
6.883	212.01	6.890	219.07	6.874	225.56	6.955	234.49	6.914	238.31
6.863	210.51	6.870	217.41	6.854	223.50	6.935	232.28	6.894	236.04
6.843	208.99	6.850	215.85	6.834	221.54	6.915	230.15	6.874	233.71
6.823	207.64	6.830	214.26	6.814	219.87	6.895	228.14	6.853	231.55
6.803	206.20	6.810	212.64	6.794	218.12	6.874	226.20	6.833	229.45
6.783	204.65	6.790	211.12	6.774	216.55	6.854	224.30	6.813	227.35
6.763	203.38	6.770	209.53	6.754	214.96	6.834	222.47	6.793	225.38
6.743	202.00	6.750	208.03	6.734	213.38	6.814	220.71	6.773	223.34
6.723	200.47	6.730	206.50	6.714	211.75	6.794	218.99	6.753	221.42
6.703	199.21	6.710	204.99	6.694	210.14	6.774	217.25	6.733	219.47
6.683	197.97	6.690	203.64	6.674	208.48	6.753	215.81	6.713	217.68
6.664	196.67	6.670	202.21	6.655	206.93	6.733	214.14	6.693	215.82
6.644	195.41	6.650	200.81	6.635	205.50	6.713	212.21	6.673	214.10
6.624	194.09	6.630	199.49	6.615	204.02	6.693	210.63	6.653	212.28
6.604	192.82	6.610	198.10	6.595	202.50	6.673	209.16	6.633	210.60
6.584	191.53	6.590	196.72	6.575	200.91	6.653	207.54	6.613	208.89
6.564	190.26	6.570	195.41	6.555	199.46	6.633	205.97	6.593	207.24
6.544	188.96	6.550	194.08	6.535	198.00	6.612	204.54	6.573	205.68
6.524	187.85	6.530	192.75	6.515	196.62	6.592	203.01	6.553	204.01
6.504	186.62	6.510	191.46	6.495	195.26	6.572	201.52	6.533	202.48
6.484	185.38	6.490	190.13	6.475	194.07	6.552	199.97	6.513	200.97
6.464	184.12	6.471	188.89	6.455	192.69	6.532	198.55	6.493	199.44
6.444	183.10	6.451	187.68	6.435	191.43	6.512	197.17	6.473	197.91
6.424	181.91	6.431	186.46	6.415	190.17	6.491	195.88	6.453	196.45
6.404	180.72	6.411	185.21	6.396	188.90	6.471	194.52	6.433	195.00
6.384	179.63	6.391	184.06	6.376	187.66	6.451	193.14	6.413	193.60
6.365	178.56	6.371	182.91	6.356	186.25	6.431	191.86	6.393	192.20
6.345	177.31	6.351	181.71	6.336	185.12	6.411	190.56	6.373	190.83
6.325	176.26	6.331	180.56	6.316	183.93	6.391	189.28	6.353	189.38
6.305	175.19	6.311	179.34	6.296	182.72	6.371	188.02	6.333	188.13

6.285	174.18	6.291	178.22	6.276	181.42	6.350	186.71	6.313	186.66
6.265	173.08	6.271	177.20	6.256	180.26	6.330	185.47	6.293	185.41
6.245	171.82	6.251	176.07	6.236	179.02	6.310	184.25	6.273	184.11
6.225	170.85	6.231	175.00	6.216	177.90	6.290	182.95	6.252	182.78
6.205	169.89	6.211	173.91	6.196	176.81	6.270	181.74	6.232	181.60
6.185	168.74	6.191	172.83	6.176	175.60	6.250	180.46	6.212	180.28
6.165	167.86	6.171	171.75	6.156	174.49	6.229	179.25	6.192	179.03
6.145	166.76	6.151	170.63	6.137	173.29	6.209	178.15	6.172	177.81
6.125	165.86	6.131	169.65	6.117	172.17	6.189	176.95	6.152	176.66
6.105	164.78	6.111	168.52	6.097	171.01	6.169	175.80	6.132	175.38
6.086	163.74	6.091	167.50	6.077	170.07	6.149	174.62	6.112	174.32
6.066	162.89	6.071	166.50	6.057	168.97	6.129	173.55	6.092	173.10
6.046	161.87	6.051	165.45	6.037	167.91	6.108	172.44	6.072	171.93
6.026	160.93	6.031	164.35	6.017	166.83	6.088	171.18	6.052	170.78
6.006	159.95	6.011	163.33	5.997	165.80	6.068	170.11	6.032	169.64
5.986	159.00	5.991	162.36	5.977	164.77	6.048	169.05	6.012	168.50
5.966	158.08	5.971	161.39	5.957	163.66	6.028	167.96	5.992	167.55
5.946	157.00	5.952	160.39	5.937	162.63	6.008	166.95	5.972	166.52
5.926	156.10	5.932	159.43	5.917	161.64	5.988	165.92	5.952	165.31
5.906	155.21	5.912	158.43	5.897	160.60	5.967	164.74	5.932	164.25
5.886	154.38	5.892	157.56	5.878	159.55	5.947	163.79	5.912	163.23
5.866	153.24	5.872	156.49	5.858	158.66	5.927	162.77	5.892	162.15
5.846	152.55	5.852	155.54	5.838	157.68	5.907	161.71	5.872	161.15
5.826	151.63	5.832	154.60	5.818	156.54	5.887	160.58	5.852	160.14
5.807	150.74	5.812	153.66	5.798	155.59	5.867	159.67	5.832	159.07
5.787	149.79	5.792	152.83	5.778	154.73	5.846	158.61	5.812	158.11
5.767	148.95	5.772	151.84	5.758	153.78	5.826	157.58	5.792	157.04
5.747	148.06	5.752	150.98	5.738	152.80	5.806	156.68	5.772	156.06
5.727	147.23	5.732	150.01	5.718	151.89	5.786	155.69	5.752	154.99
5.707	146.30	5.712	148.96	5.698	150.85	5.766	154.71	5.732	154.02
5.687	145.46	5.692	148.16	5.678	150.01	5.746	153.78	5.712	153.05
5.667	144.64	5.672	147.29	5.658	149.06	5.726	152.66	5.692	152.08
5.647	143.79	5.652	146.38	5.639	148.11	5.705	151.79	5.672	151.14

5.627	142.80	5.632	145.55	5.619	147.28	5.685	150.82	5.651	150.10
5.607	141.95	5.612	144.62	5.599	146.37	5.665	149.91	5.631	149.25
5.587	141.12	5.592	143.80	5.579	145.42	5.645	148.99	5.611	148.22
5.567	140.42	5.572	142.92	5.559	144.52	5.625	148.10	5.591	147.31
5.547	139.60	5.552	142.04	5.539	143.55	5.605	147.15	5.571	146.36
5.527	138.76	5.532	141.21	5.519	142.72	5.584	146.27	5.551	145.46
5.508	137.97	5.512	140.29	5.499	141.93	5.564	145.37	5.531	144.60
5.488	137.18	5.492	139.42	5.479	141.05	5.544	144.29	5.511	143.67
5.468	136.23	5.472	138.58	5.459	140.20	5.524	143.48	5.491	142.80
5.448	135.39	5.452	137.82	5.439	139.36	5.504	142.54	5.471	141.87
5.428	134.78	5.432	136.96	5.419	138.49	5.484	141.73	5.451	140.96
5.408	133.91	5.413	136.12	5.399	137.57	5.463	140.79	5.431	140.09
5.388	133.22	5.393	135.37	5.380	136.75	5.443	139.98	5.411	139.28
5.368	132.40	5.373	134.51	5.360	135.89	5.423	139.12	5.391	138.39
5.348	131.52	5.353	133.75	5.340	135.16	5.403	138.27	5.371	137.51
5.328	130.83	5.333	132.91	5.320	134.33	5.383	137.46	5.351	136.67
5.308	129.96	5.313	132.16	5.300	133.53	5.363	136.62	5.331	135.84
5.288	128.86	5.293	131.33	5.280	132.71	5.343	135.72	5.311	135.02
5.268	128.01	5.273	130.57	5.260	131.84	5.322	134.76	5.291	134.11
5.248	127.24	5.253	129.80	5.240	131.05	5.302	134.08	5.271	133.30
5.229	126.56	5.233	129.04	5.220	130.32	5.282	133.28	5.251	132.49
5.209	125.75	5.213	128.30	5.200	129.53	5.262	132.33	5.231	131.61
5.189	125.14	5.193	127.45	5.180	128.73	5.242	131.57	5.211	130.84
5.169	124.32	5.173	126.73	5.160	127.95	5.222	130.70	5.191	130.03
5.149	123.56	5.153	126.01	5.140	127.04	5.201	129.94	5.171	129.20
5.129	122.93	5.133	125.23	5.121	126.31	5.181	129.21	5.151	128.36
5.109	122.06	5.113	124.42	5.101	125.47	5.161	128.44	5.131	127.55
5.089	121.40	5.093	123.75	5.081	124.85	5.141	127.65	5.111	126.80
5.069	120.63	5.073	122.95	5.061	124.09	5.121	126.88	5.091	125.99
5.049	119.98	5.053	122.18	5.041	123.22	5.101	126.09	5.071	125.28
5.029	119.18	5.033	121.48	5.021	122.58	5.081	125.31	5.051	124.45
5.009	118.49	5.013	120.70	5.001	121.81	5.060	124.52	5.030	123.69
4.989	117.81	4.993	119.99	4.981	121.07	5.040	123.66	5.010	122.92

4.969	117.14	4.973	119.31	4.961	120.36	5.020	122.98	4.990	122.14
4.949	116.44	4.953	118.59	4.941	119.64	5.000	122.23	4.970	121.44
4.930	115.66	4.933	117.87	4.921	118.82	4.980	121.48	4.950	120.68
4.910	115.02	4.913	117.15	4.901	118.16	4.960	120.73	4.930	119.89
4.890	114.30	4.893	116.48	4.881	117.42	4.939	119.89	4.910	119.14
4.870	113.59	4.874	115.70	4.862	116.71	4.919	119.18	4.890	118.42
4.850	112.88	4.854	115.00	4.842	115.98	4.899	118.52	4.870	117.71
4.830	112.31	4.834	114.34	4.822	115.27	4.879	117.76	4.850	116.99
4.810	111.60	4.814	113.61	4.802	114.48	4.859	117.05	4.830	116.22
4.790	110.90	4.794	112.93	4.782	113.87	4.839	116.32	4.810	115.50
4.770	110.24	4.774	112.30	4.762	113.19	4.818	115.63	4.790	114.78
4.750	109.58	4.754	111.59	4.742	112.46	4.798	114.93	4.770	114.06
4.730	108.89	4.734	110.92	4.722	111.70	4.778	114.12	4.750	113.41
4.710	108.25	4.714	110.26	4.702	110.98	4.758	113.43	4.730	112.68
4.690	107.61	4.694	109.52	4.682	110.34	4.738	112.75	4.710	111.99
4.670	106.97	4.674	108.86	4.662	109.70	4.718	112.06	4.690	111.25
4.651	106.29	4.654	108.21	4.642	109.02	4.698	111.40	4.670	110.57
4.631	105.58	4.634	107.63	4.622	108.37	4.677	110.64	4.650	109.84
4.611	104.92	4.614	106.94	4.603	107.68	4.657	109.96	4.630	109.14
4.591	104.36	4.594	106.28	4.583	106.97	4.637	109.32	4.610	108.49
4.571	103.62	4.574	105.60	4.563	106.21	4.617	108.59	4.590	107.83
4.551	103.08	4.554	104.98	4.543	105.68	4.597	107.89	4.570	107.12
4.531	102.43	4.534	104.31	4.523	104.94	4.577	107.21	4.550	106.49
4.511	101.74	4.514	103.66	4.503	104.36	4.556	106.60	4.530	105.77
4.491	101.09	4.494	103.02	4.483	103.71	4.536	105.89	4.510	105.08
4.471	100.56	4.474	102.43	4.463	103.05	4.516	105.23	4.490	104.42
4.451	99.94	4.454	101.78	4.443	102.39	4.496	104.47	4.470	103.77
4.431	99.26	4.434	101.10	4.423	101.68	4.476	103.89	4.450	103.13
4.411	98.66	4.414	100.48	4.403	101.02	4.456	103.20	4.429	102.49
4.391	98.00	4.394	99.88	4.383	100.36	4.436	102.56	4.409	101.85
4.372	97.39	4.374	99.25	4.363	99.82	4.415	101.95	4.389	101.14
4.352	96.84	4.355	98.60	4.344	99.19	4.395	101.26	4.369	100.49
4.332	96.20	4.335	97.97	4.324	98.50	4.375	100.63	4.349	99.91

4.312	95.60	4.315	97.33	4.304	97.77	4.355	99.90	4.329	99.24
4.292	94.98	4.295	96.76	4.284	97.28	4.335	99.27	4.309	98.64
4.272	94.37	4.275	96.13	4.264	96.56	4.315	98.70	4.289	97.98
4.252	93.84	4.255	95.57	4.244	96.05	4.294	98.06	4.269	97.36
4.232	93.24	4.235	94.95	4.224	95.30	4.274	97.44	4.249	96.68
4.212	92.63	4.215	94.25	4.204	94.69	4.254	96.78	4.229	96.09
4.192	92.03	4.195	93.70	4.184	94.09	4.234	96.13	4.209	95.43
4.172	91.44	4.175	93.14	4.164	93.63	4.214	95.43	4.189	94.79
4.152	90.85	4.155	92.49	4.144	92.96	4.194	94.86	4.169	94.21
4.132	90.26	4.135	91.88	4.124	92.37	4.173	94.21	4.149	93.58
4.112	89.67	4.115	91.31	4.104	91.80	4.153	93.54	4.129	92.98
4.092	89.08	4.095	90.75	4.085	91.09	4.133	93.01	4.109	92.40
4.073	88.57	4.075	90.18	4.065	90.53	4.113	92.40	4.089	91.76
4.053	87.99	4.055	89.56	4.045	89.90	4.093	91.72	4.069	91.14
4.033	87.41	4.035	88.98	4.025	89.37	4.073	91.14	4.049	90.58
4.013	86.83	4.015	88.39	4.005	88.77	4.053	90.54	4.029	89.98
3.993	86.23	3.995	87.83	3.985	88.16	4.032	90.00	4.009	89.41
3.973	85.67	3.975	87.26	3.965	87.59	4.012	89.36	3.989	88.76
3.953	85.18	3.955	86.68	3.945	86.93	3.992	88.78	3.969	88.22
3.933	84.62	3.935	86.09	3.925	86.35	3.972	88.16	3.949	87.57
3.913	84.00	3.915	85.52	3.905	85.81	3.952	87.59	3.929	87.05
3.893	83.50	3.895	85.00	3.885	85.28	3.932	87.02	3.909	86.37
3.873	82.89	3.875	84.36	3.865	84.74	3.911	86.42	3.889	85.77
3.853	82.42	3.855	83.83	3.845	84.13	3.891	85.85	3.869	85.28
3.833	81.86	3.835	83.31	3.826	83.55	3.871	85.24	3.849	84.67
3.813	81.31	3.816	82.71	3.806	82.99	3.851	84.68	3.829	84.16
3.794	80.76	3.796	82.20	3.786	82.44	3.831	84.03	3.808	83.55
3.774	80.22	3.776	81.64	3.766	81.87	3.811	83.51	3.788	83.03
3.754	79.70	3.756	81.07	3.746	81.30	3.790	82.93	3.768	82.40
3.734	79.20	3.736	80.54	3.726	80.70	3.770	82.38	3.748	81.82
3.714	78.63	3.716	80.00	3.706	80.13	3.750	81.79	3.728	81.19
3.694	78.10	3.696	79.44	3.686	79.62	3.730	81.17	3.708	80.65
3.674	77.62	3.676	78.83	3.666	79.05	3.710	80.62	3.688	80.16

3.654	77.06	3.656	78.36	3.646	78.42	3.690	80.04	3.668	79.58
3.634	76.53	3.636	77.79	3.626	78.01	3.670	79.52	3.648	78.94
3.614	76.03	3.616	77.23	3.606	77.41	3.649	78.95	3.628	78.51
3.594	75.49	3.596	76.71	3.587	76.91	3.629	78.30	3.608	77.90
3.574	75.00	3.576	76.15	3.567	76.31	3.609	77.79	3.588	77.32
3.554	74.49	3.556	75.66	3.547	75.86	3.589	77.29	3.568	76.78
3.534	73.96	3.536	75.08	3.527	75.26	3.569	76.70	3.548	76.26
3.515	73.51	3.516	74.60	3.507	74.72	3.549	76.17	3.528	75.68
3.495	72.97	3.496	74.01	3.487	74.21	3.528	75.67	3.508	75.19
3.475	72.44	3.476	73.56	3.467	73.61	3.508	75.07	3.488	74.64
3.455	71.92	3.456	72.98	3.447	73.13	3.488	74.50	3.468	74.04
3.435	71.49	3.436	72.45	3.427	72.54	3.468	73.99	3.448	73.55
3.415	70.97	3.416	71.98	3.407	71.95	3.448	73.45	3.428	72.96
3.395	70.46	3.396	71.46	3.387	71.52	3.428	72.93	3.408	72.53
3.375	70.02	3.376	70.93	3.367	71.03	3.408	72.40	3.388	71.94
3.355	69.51	3.356	70.42	3.347	70.38	3.387	71.86	3.368	71.39
3.335	69.01	3.336	69.91	3.328	69.94	3.367	71.26	3.348	70.88
3.315	68.49	3.316	69.39	3.308	69.45	3.347	70.75	3.328	70.30
3.295	68.06	3.296	68.81	3.288	68.97	3.327	70.27	3.308	69.87
3.275	67.56	3.277	68.32	3.268	68.34	3.307	69.72	3.288	69.27
3.255	67.05	3.257	67.84	3.248	67.91	3.287	69.20	3.268	68.78
3.235	66.55	3.237	67.27	3.228	67.39	3.266	68.65	3.248	68.24
3.216	66.05	3.217	66.80	3.208	66.86	3.246	68.16	3.228	67.76
3.196	65.63	3.197	66.30	3.188	66.28	3.226	67.66	3.207	67.24
3.176	65.14	3.177	65.80	3.168	65.82	3.206	67.08	3.187	66.72
3.156	64.64	3.157	65.25	3.148	65.33	3.186	66.56	3.167	66.22
3.136	64.15	3.137	64.80	3.128	64.82	3.166	66.08	3.147	65.67
3.116	63.65	3.117	64.31	3.108	64.35	3.145	65.51	3.127	65.16
3.096	63.25	3.097	63.81	3.088	63.83	3.125	65.01	3.107	64.70
3.076	62.76	3.077	63.27	3.069	63.32	3.105	64.48	3.087	64.23
3.056	62.19	3.057	62.76	3.049	62.86	3.085	64.02	3.067	63.76
3.036	61.70	3.037	62.27	3.029	62.36	3.065	63.47	3.047	63.24
3.016	61.24	3.017	61.78	3.009	61.85	3.045	62.93	3.027	62.68

2.996	60.76	2.997	61.31	2.989	61.36	3.025	62.45	3.007	62.22
2.976	60.36	2.977	60.83	2.969	60.86	3.004	61.98	2.987	61.70
2.956	59.83	2.957	60.34	2.949	60.41	2.984	61.44	2.967	61.18
2.937	59.36	2.937	59.86	2.929	59.90	2.964	60.94	2.947	60.64
2.917	58.91	2.917	59.37	2.909	59.40	2.944	60.45	2.927	60.20
2.897	58.44	2.897	58.88	2.889	58.93	2.924	59.99	2.907	59.65
2.877	57.97	2.877	58.39	2.869	58.41	2.904	59.43	2.887	59.21
2.857	57.46	2.857	57.89	2.849	57.97	2.883	58.98	2.867	58.66
2.837	57.06	2.837	57.45	2.829	57.43	2.863	58.48	2.847	58.20
2.817	56.52	2.817	56.95	2.810	57.02	2.843	57.98	2.827	57.74
2.797	56.07	2.797	56.47	2.790	56.44	2.823	57.49	2.807	57.19
2.777	55.60	2.777	56.00	2.770	56.06	2.803	56.97	2.787	56.77
2.757	55.15	2.758	55.48	2.750	55.55	2.783	56.54	2.767	56.27
2.737	54.70	2.738	55.04	2.730	55.10	2.763	56.02	2.747	55.71
2.717	54.17	2.718	54.58	2.710	54.57	2.742	55.59	2.727	55.33
2.697	53.72	2.698	54.04	2.690	54.17	2.722	55.06	2.707	54.77
2.677	53.29	2.678	53.62	2.670	53.64	2.702	54.59	2.687	54.36
2.657	52.85	2.658	53.19	2.650	53.17	2.682	54.09	2.667	53.87
2.638	52.36	2.638	52.72	2.630	52.73	2.662	53.63	2.647	53.38
2.618	51.88	2.618	52.24	2.610	52.23	2.642	53.17	2.627	52.92
2.598	51.45	2.598	51.76	2.590	51.83	2.621	52.70	2.607	52.47
2.578	51.02	2.578	51.27	2.570	51.35	2.601	52.23	2.586	52.03
2.558	50.58	2.558	50.87	2.551	50.87	2.581	51.68	2.566	51.55
2.538	50.07	2.538	50.46	2.531	50.42	2.561	51.27	2.546	51.03
2.518	49.64	2.518	49.95	2.511	49.96	2.541	50.79	2.526	50.61
2.498	49.18	2.498	49.52	2.491	49.48	2.521	50.30	2.506	50.10
2.478	48.72	2.478	49.09	2.471	49.04	2.500	49.83	2.486	49.69
2.458	48.29	2.458	48.57	2.451	48.61	2.480	49.38	2.466	49.15
2.438	47.88	2.438	48.18	2.431	48.10	2.460	48.96	2.446	48.71
2.418	47.38	2.418	47.72	2.411	47.67	2.440	48.45	2.426	48.23
2.398	46.97	2.398	47.28	2.391	47.22	2.420	48.04	2.406	47.81
2.378	46.49	2.378	46.80	2.371	46.76	2.400	47.53	2.386	47.35
2.359	46.07	2.358	46.39	2.351	46.32	2.380	47.09	2.366	46.89

2.339	45.67	2.338	45.95	2.331	45.85	2.359	46.59	2.346	46.42
2.319	45.19	2.318	45.51	2.311	45.45	2.339	46.21	2.326	46.02
2.299	44.79	2.298	45.06	2.292	45.04	2.319	45.76	2.306	45.49
2.279	44.37	2.278	44.60	2.272	44.57	2.299	45.28	2.286	45.01
2.259	43.91	2.258	44.16	2.252	44.15	2.279	44.75	2.266	44.66
2.239	43.45	2.238	43.72	2.232	43.69	2.259	44.36	2.246	44.16
2.219	43.04	2.219	43.29	2.212	43.25	2.238	43.89	2.226	43.75
2.199	42.59	2.199	42.89	2.192	42.86	2.218	43.46	2.206	43.29
2.179	42.12	2.179	42.42	2.172	42.36	2.198	42.98	2.186	42.83
2.159	41.73	2.159	42.02	2.152	41.89	2.178	42.56	2.166	42.34
2.139	41.27	2.139	41.54	2.132	41.50	2.158	42.13	2.146	42.03
2.119	40.89	2.119	41.14	2.112	41.07	2.138	41.68	2.126	41.50
2.099	40.46	2.099	40.70	2.092	40.65	2.118	41.18	2.106	41.07
2.080	40.05	2.079	40.28	2.072	40.19	2.097	40.81	2.086	40.64
2.060	39.67	2.059	39.86	2.052	39.77	2.077	40.35	2.066	40.21
2.040	39.20	2.039	39.44	2.033	39.31	2.057	39.92	2.046	39.77
2.020	38.74	2.019	38.98	2.013	38.87	2.037	39.43	2.026	39.33
2.000	38.36	1.999	38.57	1.993	38.46	2.017	39.03	2.006	38.89
1.980	37.91	1.979	38.13	1.973	38.02	1.997	38.61	1.985	38.45
1.960	37.53	1.959	37.72	1.953	37.64	1.976	38.14	1.965	37.99
1.940	37.08	1.939	37.26	1.933	37.22	1.956	37.78	1.945	37.56
1.920	36.68	1.919	36.85	1.913	36.78	1.936	37.32	1.925	37.16
1.900	36.25	1.899	36.39	1.893	36.33	1.916	36.87	1.905	36.79
1.880	35.88	1.879	35.98	1.873	35.91	1.896	36.43	1.885	36.32
1.860	35.43	1.859	35.55	1.853	35.51	1.876	36.00	1.865	35.86
1.840	34.98	1.839	35.13	1.833	35.09	1.855	35.59	1.845	35.44
1.820	34.59	1.819	34.76	1.813	34.70	1.835	35.19	1.825	34.98
1.800	34.17	1.799	34.32	1.793	34.25	1.815	34.71	1.805	34.58
1.781	33.73	1.779	33.86	1.774	33.86	1.795	34.29	1.785	34.18
1.761	33.37	1.759	33.44	1.754	33.38	1.775	33.88	1.765	33.77
1.741	32.93	1.739	33.05	1.734	32.98	1.755	33.44	1.745	33.37
1.721	32.57	1.719	32.64	1.714	32.47	1.735	33.07	1.725	32.91
1.701	32.22	1.699	32.18	1.694	32.08	1.714	32.63	1.705	32.53

1.681	31.74	1.680	31.79	1.674	31.71	1.694	32.18	1.685	32.10
1.661	31.36	1.660	31.40	1.654	31.29	1.674	31.80	1.665	31.66
1.641	30.94	1.640	30.98	1.634	30.84	1.654	31.35	1.645	31.23
1.621	30.53	1.620	30.58	1.614	30.48	1.634	30.94	1.625	30.80
1.601	30.18	1.600	30.14	1.594	30.06	1.614	30.53	1.605	30.50
1.581	29.77	1.580	29.74	1.574	29.67	1.593	30.12	1.585	30.04
1.561	29.40	1.560	29.35	1.554	29.27	1.573	29.70	1.565	29.66
1.541	28.98	1.540	28.94	1.535	28.81	1.553	29.35	1.545	29.19
1.521	28.60	1.520	28.50	1.515	28.42	1.533	28.91	1.525	28.79
1.502	28.16	1.500	28.15	1.495	28.01	1.513	28.47	1.505	28.39
1.482	27.80	1.480	27.72	1.475	27.69	1.493	28.07	1.485	28.05
1.462	27.42	1.460	27.34	1.455	27.22	1.473	27.67	1.465	27.66
1.442	27.01	1.440	26.91	1.435	26.83	1.452	27.27	1.445	27.20
1.422	26.66	1.420	26.51	1.415	26.43	1.432	26.86	1.425	26.79
1.402	26.23	1.400	26.12	1.395	26.04	1.412	26.44	1.405	26.43
1.382	25.85	1.380	25.73	1.375	25.65	1.392	26.04	1.385	25.97
1.362	25.45	1.360	25.33	1.355	25.25	1.372	25.63	1.364	25.60
1.342	25.08	1.340	24.94	1.335	24.86	1.352	25.22	1.344	25.22
1.322	24.70	1.320	24.55	1.315	24.46	1.331	24.84	1.324	24.78
1.302	24.30	1.300	24.16	1.295	24.07	1.311	24.47	1.304	24.40
1.282	23.91	1.280	23.76	1.276	23.68	1.291	24.03	1.284	24.04
1.262	23.53	1.260	23.36	1.256	23.29	1.271	23.66	1.264	23.57
1.242	23.15	1.240	22.98	1.236	22.89	1.251	23.26	1.244	23.16
1.223	22.76	1.220	22.65	1.216	22.57	1.231	22.89	1.224	22.79
1.203	22.37	1.200	22.18	1.196	22.18	1.210	22.50	1.204	22.35
1.183	21.93	1.180	21.79	1.176	21.78	1.190	22.11	1.184	21.99
1.163	21.61	1.161	21.47	1.156	21.40	1.170	21.72	1.164	21.60
1.143	21.17	1.141	21.08	1.136	21.00	1.150	21.30	1.144	21.23
1.123	20.85	1.121	20.69	1.116	20.61	1.130	20.93	1.124	20.80
1.103	20.45	1.101	20.29	1.096	20.22	1.110	20.53	1.104	20.50
1.083	20.01	1.081	19.98	1.076	19.85	1.090	20.08	1.084	20.10
1.063	19.69	1.061	19.59	1.056	19.48	1.069	19.74	1.064	19.70
1.043	19.29	1.041	19.19	1.036	19.11	1.049	19.35	1.044	19.34

1.023	18.87	1.021	18.84	1.017	18.73	1.029	18.96	1.024	18.93
1.003	18.48	1.001	18.48	0.997	18.41	1.009	18.56	1.004	18.52
0.983	18.09	0.981	18.09	0.977	18.01	0.989	18.19	0.984	18.19
0.963	17.72	0.961	17.70	0.957	17.58	0.969	17.86	0.964	17.80
0.943	17.40	0.941	17.38	0.937	17.30	0.948	17.46	0.944	17.38
0.924	16.96	0.921	16.99	0.917	16.91	0.928	17.02	0.924	17.00
0.904	16.66	0.901	16.60	0.897	16.44	0.908	16.64	0.904	16.63
0.884	16.20	0.881	16.20	0.877	16.16	0.888	16.25	0.884	16.30
0.864	15.90	0.861	15.81	0.857	15.73	0.868	15.89	0.864	15.89
0.844	15.49	0.841	15.42	0.837	15.33	0.848	15.49	0.844	15.54
0.824	15.10	0.821	15.02	0.817	14.92	0.828	15.13	0.824	15.17
0.804	14.77	0.801	14.61	0.797	14.51	0.807	14.74	0.804	14.77
0.784	14.39	0.781	14.24	0.777	14.16	0.787	14.34	0.784	14.38
0.764	14.00	0.761	13.85	0.758	13.77	0.767	13.98	0.763	14.03
0.744	13.64	0.741	13.45	0.738	13.45	0.747	13.60	0.743	13.60
0.724	13.25	0.721	13.13	0.718	13.06	0.727	13.21	0.723	13.27
0.704	12.87	0.701	12.74	0.698	12.66	0.707	12.82	0.703	12.85
0.684	12.50	0.681	12.35	0.678	12.33	0.686	12.50	0.683	12.50
0.664	12.12	0.661	12.03	0.658	11.97	0.666	12.09	0.663	12.10
0.645	11.77	0.641	11.64	0.638	11.56	0.646	11.75	0.643	11.76
0.625	11.46	0.622	11.32	0.618	11.25	0.626	11.39	0.623	11.40
0.605	11.07	0.602	10.93	0.598	10.85	0.606	11.02	0.603	11.07
0.585	10.70	0.582	10.62	0.578	10.54	0.586	10.62	0.583	10.66
0.565	10.32	0.562	10.22	0.558	10.14	0.565	10.23	0.563	10.30
0.545	9.95	0.542	9.83	0.538	9.83	0.545	9.88	0.543	9.90
0.525	9.55	0.522	9.52	0.518	9.44	0.525	9.51	0.523	9.51
0.505	9.18	0.502	9.13	0.499	9.09	0.505	9.18	0.503	9.20
0.485	8.88	0.482	8.81	0.479	8.73	0.485	8.76	0.483	8.80
0.465	8.50	0.462	8.47	0.459	8.41	0.465	8.41	0.463	8.41
0.445	8.12	0.442	8.10	0.439	7.99	0.445	8.03	0.443	8.10
0.425	7.79	0.422	7.76	0.419	7.68	0.424	7.71	0.423	7.70
0.405	7.39	0.402	7.39	0.399	7.27	0.404	7.31	0.403	7.32
0.385	7.06	0.382	7.00	0.379	7.00	0.384	6.92	0.383	7.03

0.365	6.68	0.362	6.68	0.359	6.61	0.364	6.61	0.363	6.66
0.346	6.30	0.342	6.32	0.339	6.29	0.344	6.21	0.343	6.25
0.326	6.01	0.322	5.98	0.319	5.96	0.324	5.85	0.323	5.90
0.306	5.62	0.302	5.66	0.299	5.54	0.303	5.50	0.303	5.58
0.286	5.24	0.282	5.34	0.279	5.08	0.283	5.15	0.283	5.18
0.266	4.93	0.262	4.96	0.259	4.72	0.263	4.76	0.263	4.80
0.246	4.55	0.242	4.63	0.240	4.35	0.243	4.42	0.243	4.44
0.226	4.25	0.222	4.27	0.220	4.05	0.223	4.05	0.223	4.10
0.206	3.84	0.202	3.89	0.200	3.76	0.203	3.74	0.203	3.75
0.186	3.53	0.182	3.51	0.180	3.34	0.183	3.42	0.183	3.40
0.166	3.21	0.162	3.15	0.160	2.94	0.162	3.03	0.163	3.10
0.146	2.80	0.142	2.79	0.140	2.67	0.142	2.66	0.142	2.80
0.126	2.48	0.122	2.44	0.120	2.28	0.122	2.27	0.122	2.42
0.106	2.12	0.103	2.12	0.100	1.97	0.102	1.89	0.102	2.00

TABLE S3. Experimental densities of $\{x \text{ CO}_2 + (1-x) \text{ CO}\}$ binary mixtures at $T = 308.15 \text{ K}$

$x = 0.9700$		$x = 0.9810$		$x = 0.9902$		$x = 0.9930$		$x = 0.9960$	
P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$	P / MPa	$\rho / \text{kg.m}^{-3}$
20.010	832.70	19.997	844.85	20.092	855.59	20.309	861.65	20.590	867.71
19.990	832.70	19.977	845.12	20.072	855.60	20.289	861.54	20.570	867.50
19.970	832.60	19.957	845.26	20.052	855.47	20.268	861.33	20.549	867.38
19.950	832.50	19.937	845.35	20.032	855.35	20.248	861.24	20.529	867.22
19.930	832.50	19.917	845.26	20.012	855.19	20.228	861.08	20.508	867.06
19.910	832.30	19.897	845.16	19.992	855.03	20.208	860.92	20.488	866.90
19.890	832.10	19.877	845.01	19.972	854.87	20.187	860.78	20.467	866.73
19.870	832.03	19.857	844.87	19.952	854.70	20.167	860.62	20.447	866.57
19.850	831.81	19.838	844.73	19.932	854.54	20.147	860.47	20.426	866.49
19.830	831.70	19.818	844.51	19.912	854.33	20.127	860.33	20.406	866.35
19.810	831.50	19.798	844.37	19.892	854.20	20.107	860.19	20.385	866.21
19.790	831.30	19.778	844.24	19.872	854.05	20.086	860.06	20.365	866.07
19.770	831.20	19.758	844.07	19.852	853.90	20.066	859.92	20.344	865.92
19.750	830.93	19.738	843.87	19.832	853.73	20.046	859.78	20.324	865.72
19.731	830.80	19.718	843.74	19.812	853.57	20.026	859.60	20.303	865.58
19.711	830.60	19.698	843.59	19.792	853.41	20.005	859.42	20.283	865.44
19.691	830.40	19.678	843.43	19.772	853.27	19.985	859.25	20.262	865.27
19.671	830.20	19.658	843.24	19.752	853.04	19.965	859.10	20.242	865.09
19.651	830.00	19.638	843.10	19.732	852.92	19.945	858.97	20.221	864.96
19.631	829.90	19.619	842.93	19.712	852.71	19.924	858.77	20.201	864.81
19.611	829.69	19.599	842.73	19.692	852.60	19.904	858.61	20.180	864.65
19.591	829.50	19.579	842.58	19.672	852.43	19.884	858.47	20.160	864.46
19.571	829.30	19.559	842.44	19.652	852.23	19.864	858.33	20.139	864.33
19.551	829.10	19.539	842.22	19.632	852.06	19.844	858.17	20.119	864.18
19.531	828.91	19.519	842.07	19.612	851.91	19.823	857.98	20.098	863.97
19.511	828.70	19.499	841.85	19.592	851.70	19.803	857.81	20.078	863.80
19.491	828.60	19.479	841.71	19.572	851.53	19.783	857.70	20.057	863.65
19.471	828.40	19.459	841.57	19.552	851.37	19.763	857.44	20.037	863.50
19.452	828.20	19.439	841.34	19.532	851.21	19.742	857.35	20.016	863.32

19.432	828.00	19.419	841.21	19.512	851.01	19.722	857.21	19.996	863.18
19.412	827.80	19.399	840.98	19.492	850.83	19.702	857.04	19.975	863.00
19.392	827.65	19.380	840.85	19.472	850.64	19.682	856.87	19.955	862.83
19.372	827.40	19.360	840.63	19.452	850.48	19.662	856.74	19.934	862.68
19.352	827.27	19.340	840.48	19.432	850.33	19.641	856.54	19.914	862.46
19.332	827.04	19.320	840.29	19.412	850.15	19.621	856.36	19.893	862.33
19.312	826.90	19.300	840.11	19.392	849.98	19.601	856.17	19.873	862.18
19.292	826.70	19.280	839.94	19.372	849.79	19.581	856.00	19.852	862.02
19.272	826.50	19.260	839.74	19.352	849.59	19.560	855.91	19.832	861.79
19.252	826.30	19.240	839.61	19.332	849.42	19.540	855.69	19.811	861.68
19.232	826.07	19.220	839.37	19.312	849.26	19.520	855.46	19.791	861.46
19.212	825.98	19.200	839.23	19.292	849.02	19.500	855.34	19.770	861.29
19.192	825.70	19.180	838.99	19.272	848.89	19.480	855.20	19.750	861.13
19.173	825.57	19.160	838.85	19.252	848.69	19.459	855.04	19.729	860.97
19.153	825.30	19.141	838.63	19.232	848.50	19.439	854.87	19.709	860.80
19.133	825.19	19.121	838.45	19.212	848.31	19.419	854.65	19.688	860.61
19.113	824.94	19.101	838.27	19.192	848.12	19.399	854.46	19.668	860.45
19.093	824.70	19.081	838.07	19.172	847.96	19.378	854.31	19.647	860.29
19.073	824.50	19.061	837.90	19.152	847.77	19.358	854.12	19.627	860.12
19.053	824.30	19.041	837.72	19.132	847.61	19.338	853.96	19.606	859.93
19.033	824.06	19.021	837.51	19.112	847.38	19.318	853.79	19.585	859.74
19.013	823.90	19.001	837.31	19.092	847.23	19.297	853.62	19.565	859.57
18.993	823.71	18.981	837.18	19.072	847.06	19.277	853.46	19.544	859.42
18.973	823.49	18.961	836.95	19.052	846.88	19.257	853.30	19.524	859.26
18.953	823.34	18.941	836.73	19.032	846.66	19.237	853.10	19.503	859.03
18.933	823.11	18.921	836.54	19.012	846.49	19.217	852.88	19.483	858.87
18.913	823.00	18.902	836.37	18.991	846.25	19.196	852.75	19.462	858.68
18.894	822.80	18.882	836.20	18.971	846.10	19.176	852.53	19.442	858.49
18.874	822.60	18.862	836.02	18.951	845.92	19.156	852.31	19.421	858.30
18.854	822.41	18.842	835.82	18.931	845.76	19.136	852.19	19.401	858.20
18.834	822.15	18.822	835.61	18.911	845.55	19.115	851.98	19.380	857.97
18.814	822.01	18.802	835.45	18.891	845.36	19.095	851.83	19.360	857.80
18.794	821.80	18.782	835.22	18.871	845.19	19.075	851.63	19.339	857.63

18.774	821.66	18.762	835.04	18.851	845.00	19.055	851.46	19.319	857.46
18.754	821.40	18.742	834.85	18.831	844.79	19.035	851.27	19.298	857.27
18.734	821.29	18.722	834.60	18.811	844.62	19.014	851.08	19.278	857.10
18.714	821.02	18.702	834.44	18.791	844.43	18.994	850.92	19.257	856.93
18.694	820.80	18.682	834.29	18.771	844.24	18.974	850.68	19.237	856.75
18.674	820.66	18.663	834.06	18.751	844.05	18.954	850.26	19.216	856.57
18.654	820.40	18.643	833.82	18.731	843.90	18.933	849.79	19.196	856.41
18.634	820.26	18.623	833.66	18.711	843.67	18.913	849.51	19.175	856.25
18.615	820.03	18.603	833.47	18.691	843.51	18.893	849.33	19.155	856.01
18.595	819.83	18.583	833.29	18.671	843.16	18.873	849.19	19.134	855.85
18.575	819.60	18.563	833.04	18.651	843.10	18.852	849.00	19.114	855.68
18.555	819.41	18.543	832.86	18.631	842.93	18.832	848.81	19.093	855.50
18.535	819.13	18.523	832.68	18.611	842.67	18.812	848.65	19.073	855.28
18.515	819.00	18.503	832.47	18.591	842.51	18.792	848.46	19.052	855.11
18.495	818.71	18.483	832.30	18.571	842.35	18.772	848.25	19.032	854.95
18.475	818.58	18.463	832.08	18.551	842.10	18.751	848.09	19.011	854.77
18.455	818.34	18.443	831.93	18.531	841.94	18.731	847.97	18.991	854.57
18.435	818.18	18.424	831.70	18.511	841.79	18.711	847.80	18.970	854.36
18.415	817.90	18.404	831.48	18.491	841.56	18.691	847.58	18.950	854.17
18.395	817.77	18.384	831.26	18.471	841.41	18.670	847.43	18.929	854.00
18.375	817.48	18.364	831.04	18.451	841.21	18.650	847.30	18.909	853.81
18.355	817.33	18.344	830.88	18.431	841.04	18.630	847.08	18.888	853.63
18.336	817.13	18.324	830.67	18.411	840.86	18.610	846.90	18.868	853.49
18.316	816.90	18.304	830.49	18.391	840.62	18.590	846.78	18.847	853.30
18.296	816.65	18.284	830.24	18.371	840.48	18.569	846.61	18.827	853.11
18.276	816.47	18.264	830.08	18.351	840.23	18.549	846.45	18.806	852.91
18.256	816.30	18.244	829.85	18.331	840.07	18.529	846.28	18.786	852.73
18.236	816.00	18.224	829.66	18.311	839.85	18.509	846.06	18.765	852.52
18.216	815.83	18.205	829.47	18.291	839.66	18.488	845.86	18.745	852.32
18.196	815.61	18.185	829.24	18.271	839.50	18.468	845.69	18.724	852.18
18.176	815.40	18.165	829.05	18.251	839.27	18.448	845.52	18.704	851.98
18.156	815.20	18.145	828.82	18.231	839.07	18.428	845.35	18.683	851.78
18.136	814.97	18.125	828.65	18.211	838.85	18.407	845.16	18.663	851.56

18.116	814.70	18.105	828.41	18.191	838.74	18.387	844.98	18.642	851.41
18.096	814.57	18.085	828.25	18.171	838.53	18.367	844.82	18.622	851.21
18.076	814.32	18.065	828.04	18.151	838.29	18.347	844.60	18.601	851.05
18.057	814.11	18.045	827.80	18.131	838.05	18.327	844.45	18.581	850.80
18.037	813.90	18.025	827.59	18.111	837.87	18.306	844.22	18.560	850.64
18.017	813.64	18.005	827.34	18.091	837.71	18.286	844.05	18.540	850.42
17.997	813.40	17.985	827.19	18.071	837.48	18.266	843.88	18.519	850.27
17.977	813.16	17.966	826.95	18.051	837.30	18.246	843.70	18.499	850.07
17.957	813.00	17.946	826.76	18.031	837.06	18.225	843.49	18.478	849.84
17.937	812.82	17.926	826.58	18.011	836.90	18.205	843.28	18.458	849.71
17.917	812.60	17.906	826.32	17.991	836.65	18.185	843.10	18.437	849.49
17.897	812.33	17.886	826.17	17.971	836.49	18.165	842.92	18.417	849.28
17.877	812.11	17.866	825.92	17.951	836.27	18.145	842.74	18.396	849.09
17.857	811.88	17.846	825.70	17.931	836.07	18.124	842.55	18.376	848.95
17.837	811.69	17.826	825.52	17.911	835.84	18.104	842.37	18.355	848.74
17.817	811.40	17.806	825.26	17.891	835.70	18.084	842.10	18.334	848.52
17.798	811.28	17.786	825.08	17.871	835.43	18.064	841.98	18.314	848.34
17.778	811.00	17.766	824.90	17.851	835.27	18.043	841.72	18.293	848.12
17.758	810.80	17.746	824.65	17.831	835.03	18.023	841.54	18.273	847.98
17.738	810.52	17.727	824.41	17.811	834.83	18.003	841.35	18.252	847.78
17.718	810.33	17.707	824.20	17.791	834.65	17.983	841.17	18.232	847.58
17.698	810.11	17.687	824.01	17.771	834.42	17.962	840.98	18.211	847.37
17.678	809.87	17.667	823.78	17.751	834.22	17.942	840.80	18.191	847.15
17.658	809.60	17.647	823.58	17.731	834.05	17.922	840.60	18.170	846.98
17.638	809.40	17.627	823.39	17.711	833.84	17.902	840.41	18.150	846.79
17.618	809.15	17.607	823.13	17.691	833.65	17.882	840.22	18.129	846.57
17.598	808.98	17.587	822.96	17.671	833.51	17.861	840.02	18.109	846.41
17.578	808.63	17.567	822.74	17.651	833.30	17.841	839.78	18.088	846.21
17.558	808.49	17.547	822.53	17.631	833.11	17.821	839.58	18.068	845.99
17.538	808.20	17.527	822.27	17.611	832.92	17.801	839.39	18.047	845.79
17.519	808.00	17.507	822.10	17.591	832.73	17.780	839.21	18.027	845.57
17.499	807.80	17.488	821.89	17.571	832.59	17.760	839.01	18.006	845.41
17.479	807.50	17.468	821.65	17.551	832.43	17.740	838.82	17.986	845.19

17.459	807.30	17.448	821.38	17.531	832.16	17.720	838.58	17.965	845.03
17.439	807.03	17.428	821.18	17.511	831.99	17.700	838.35	17.945	844.81
17.419	806.87	17.408	820.99	17.491	831.79	17.679	838.14	17.924	844.61
17.399	806.53	17.388	820.77	17.471	831.64	17.659	838.00	17.904	844.38
17.379	806.39	17.368	820.53	17.451	831.44	17.639	837.72	17.883	844.20
17.359	806.09	17.348	820.35	17.431	831.22	17.619	837.52	17.863	843.97
17.339	805.87	17.328	820.06	17.411	831.07	17.598	837.32	17.842	843.77
17.319	805.63	17.308	819.88	17.391	830.85	17.578	837.14	17.822	843.56
17.299	805.45	17.288	819.67	17.371	830.66	17.558	836.95	17.801	843.39
17.279	805.20	17.268	819.43	17.351	830.40	17.538	836.76	17.781	843.18
17.259	804.92	17.249	819.17	17.331	830.25	17.517	836.53	17.760	842.99
17.240	804.70	17.229	818.96	17.311	830.05	17.497	836.35	17.740	842.77
17.220	804.47	17.209	818.78	17.291	829.85	17.477	836.13	17.719	842.59
17.200	804.30	17.189	818.51	17.271	829.68	17.457	835.94	17.699	842.38
17.180	803.90	17.169	818.29	17.251	829.48	17.437	835.73	17.678	842.18
17.160	803.78	17.149	818.09	17.231	829.21	17.416	835.47	17.658	841.97
17.140	803.49	17.129	817.83	17.211	829.08	17.396	835.24	17.637	841.77
17.120	803.28	17.109	817.65	17.191	828.86	17.376	835.03	17.617	841.58
17.100	803.00	17.089	817.40	17.171	828.66	17.356	834.81	17.596	841.33
17.080	802.80	17.069	817.17	17.151	828.50	17.335	834.65	17.576	841.14
17.060	802.50	17.049	816.97	17.131	828.28	17.315	834.43	17.555	840.94
17.040	802.33	17.030	816.71	17.111	828.07	17.295	834.22	17.535	840.72
17.020	802.10	17.010	816.53	17.091	827.86	17.275	834.01	17.514	840.53
17.000	801.80	16.990	816.28	17.071	827.65	17.255	833.81	17.494	840.31
16.980	801.60	16.970	816.07	17.051	827.49	17.234	833.60	17.473	840.06
16.961	801.31	16.950	815.80	17.031	827.29	17.214	833.39	17.453	839.90
16.941	801.11	16.930	815.58	17.011	827.06	17.194	833.18	17.432	839.66
16.921	800.83	16.910	815.38	16.991	826.82	17.174	832.94	17.412	839.48
16.901	800.55	16.890	815.18	16.971	826.59	17.153	832.71	17.391	839.25
16.881	800.40	16.870	814.94	16.951	826.40	17.133	832.55	17.371	839.03
16.861	800.10	16.850	814.68	16.931	826.23	17.113	832.30	17.350	838.85
16.841	799.90	16.830	814.47	16.911	825.93	17.093	832.12	17.330	838.63
16.821	799.60	16.810	814.25	16.891	825.77	17.072	831.90	17.309	838.41

16.801	799.36	16.791	814.05	16.871	825.55	17.052	831.69	17.289	838.22
16.781	799.10	16.771	813.77	16.850	825.32	17.032	831.38	17.268	838.03
16.761	798.87	16.751	813.55	16.830	825.14	17.012	831.16	17.248	837.79
16.741	798.60	16.731	813.33	16.810	824.95	16.992	831.03	17.227	837.60
16.721	798.30	16.711	813.10	16.790	824.71	16.971	830.80	17.207	837.38
16.701	798.11	16.691	812.84	16.770	824.50	16.951	830.57	17.186	837.14
16.682	797.80	16.671	812.62	16.750	824.20	16.931	830.33	17.166	836.92
16.662	797.57	16.651	812.41	16.730	824.04	16.911	830.10	17.145	836.68
16.642	797.30	16.631	812.17	16.710	823.80	16.890	829.87	17.125	836.50
16.622	797.04	16.611	811.91	16.690	823.56	16.870	829.64	17.104	836.29
16.602	796.85	16.591	811.70	16.670	823.38	16.850	829.48	17.083	836.08
16.582	796.56	16.571	811.42	16.650	823.15	16.830	829.25	17.063	835.85
16.562	796.26	16.552	811.22	16.630	822.92	16.810	829.02	17.042	835.64
16.542	796.00	16.532	810.93	16.610	822.71	16.789	828.80	17.022	835.42
16.522	795.80	16.512	810.71	16.590	822.51	16.769	828.57	17.001	835.18
16.502	795.52	16.492	810.49	16.570	822.29	16.749	828.34	16.981	834.94
16.482	795.22	16.472	810.26	16.550	822.03	16.729	828.10	16.960	834.78
16.462	795.00	16.452	810.02	16.530	821.80	16.708	827.86	16.940	834.53
16.442	794.70	16.432	809.78	16.510	821.58	16.688	827.68	16.919	834.37
16.422	794.48	16.412	809.49	16.490	821.33	16.668	827.44	16.899	834.08
16.403	794.28	16.392	809.29	16.470	821.11	16.648	827.22	16.878	833.88
16.383	794.00	16.372	809.06	16.450	820.92	16.628	826.99	16.858	833.67
16.363	793.77	16.352	808.79	16.430	820.70	16.607	826.75	16.837	833.44
16.343	793.40	16.332	808.57	16.410	820.45	16.587	826.52	16.817	833.22
16.323	793.17	16.313	808.27	16.390	820.20	16.567	826.36	16.796	832.98
16.303	792.90	16.293	808.02	16.370	819.98	16.547	826.09	16.776	832.76
16.283	792.70	16.273	807.79	16.350	819.78	16.526	825.84	16.755	832.53
16.263	792.50	16.253	807.58	16.330	819.51	16.506	825.62	16.735	832.33
16.243	792.17	16.233	807.29	16.310	819.31	16.486	825.44	16.714	832.09
16.223	791.90	16.213	807.03	16.290	819.05	16.466	825.19	16.694	831.93
16.203	791.60	16.193	806.78	16.270	818.81	16.445	824.95	16.673	831.69
16.183	791.33	16.173	806.55	16.250	818.61	16.425	824.69	16.653	831.44
16.163	791.11	16.153	806.31	16.230	818.37	16.405	824.50	16.632	831.25

16.143	790.85	16.133	806.08	16.210	818.15	16.385	824.24	16.612	831.01
16.124	790.59	16.113	805.84	16.190	817.91	16.365	824.07	16.591	830.79
16.104	790.30	16.093	805.58	16.170	817.64	16.344	823.83	16.571	830.55
16.084	789.97	16.074	805.32	16.150	817.39	16.324	823.57	16.550	830.30
16.064	789.77	16.054	805.09	16.130	817.20	16.304	823.35	16.530	830.11
16.044	789.50	16.034	804.79	16.110	816.94	16.284	823.11	16.509	829.89
16.024	789.22	16.014	804.52	16.090	816.71	16.263	822.88	16.489	829.64
16.004	788.94	15.994	804.33	16.070	816.48	16.243	822.57	16.468	829.41
15.984	788.60	15.974	804.04	16.050	816.22	16.223	822.40	16.448	829.18
15.964	788.39	15.954	803.81	16.030	816.01	16.203	822.15	16.427	828.93
15.944	788.10	15.934	803.52	16.010	815.74	16.183	821.89	16.407	828.75
15.924	787.81	15.914	803.28	15.990	815.45	16.162	821.64	16.386	828.49
15.904	787.52	15.894	803.06	15.970	815.25	16.142	821.43	16.366	828.26
15.884	787.30	15.874	802.80	15.950	815.03	16.122	821.15	16.345	828.02
15.864	787.00	15.854	802.56	15.930	814.78	16.102	820.95	16.325	827.81
15.845	786.75	15.835	802.25	15.910	814.52	16.081	820.75	16.304	827.61
15.825	786.40	15.815	802.03	15.890	814.32	16.061	820.49	16.284	827.35
15.805	786.15	15.795	801.74	15.870	814.05	16.041	820.22	16.263	827.13
15.785	785.91	15.775	801.48	15.850	813.78	16.021	819.96	16.243	826.88
15.765	785.58	15.755	801.24	15.830	813.58	16.000	819.73	16.222	826.64
15.745	785.30	15.735	800.90	15.810	813.27	15.980	819.51	16.202	826.40
15.725	785.01	15.715	800.72	15.790	813.05	15.960	819.22	16.181	826.15
15.705	784.70	15.695	800.41	15.770	812.75	15.940	818.97	16.161	825.95
15.685	784.45	15.675	800.17	15.750	812.56	15.920	818.77	16.140	825.74
15.665	784.20	15.655	799.92	15.730	812.30	15.899	818.52	16.120	825.50
15.645	783.83	15.635	799.64	15.710	812.06	15.879	818.32	16.099	825.25
15.625	783.66	15.616	799.39	15.690	811.81	15.859	818.05	16.079	825.01
15.605	783.30	15.596	799.10	15.670	811.55	15.839	817.79	16.058	824.77
15.586	782.96	15.576	798.85	15.650	811.27	15.818	817.53	16.038	824.52
15.566	782.70	15.556	798.58	15.630	811.05	15.798	817.34	16.017	824.28
15.546	782.43	15.536	798.31	15.610	810.75	15.778	817.04	15.997	824.06
15.526	782.10	15.516	797.99	15.590	810.46	15.758	816.81	15.976	823.79
15.506	781.85	15.496	797.72	15.570	810.26	15.738	816.51	15.956	823.54

15.486	781.60	15.476	797.47	15.550	810.02	15.717	816.30	15.935	823.35
15.466	781.26	15.456	797.16	15.530	809.70	15.697	816.01	15.915	823.06
15.446	781.00	15.436	796.91	15.510	809.45	15.677	815.83	15.894	822.81
15.426	780.70	15.416	796.62	15.490	809.24	15.657	815.55	15.873	822.59
15.406	780.40	15.396	796.36	15.470	808.99	15.636	815.29	15.853	822.32
15.386	780.10	15.377	796.09	15.450	808.74	15.616	815.08	15.832	822.16
15.366	779.80	15.357	795.85	15.430	808.47	15.596	814.84	15.812	821.90
15.346	779.46	15.337	795.54	15.410	808.15	15.576	814.53	15.791	821.66
15.326	779.23	15.317	795.23	15.390	807.99	15.555	814.32	15.771	821.38
15.307	779.00	15.297	794.93	15.370	807.69	15.535	814.05	15.750	821.15
15.287	778.60	15.277	794.69	15.350	807.45	15.515	813.76	15.730	820.91
15.267	778.30	15.257	794.43	15.330	807.14	15.495	813.55	15.709	820.61
15.247	778.08	15.237	794.11	15.310	806.92	15.475	813.25	15.689	820.37
15.227	777.70	15.217	793.83	15.290	806.63	15.454	813.02	15.668	820.13
15.207	777.46	15.197	793.57	15.270	806.38	15.434	812.74	15.648	819.90
15.187	777.18	15.177	793.27	15.250	806.08	15.414	812.45	15.627	819.64
15.167	776.80	15.157	792.99	15.230	805.84	15.394	812.22	15.607	819.39
15.147	776.50	15.138	792.72	15.210	805.58	15.373	811.97	15.586	819.15
15.127	776.20	15.118	792.45	15.190	805.34	15.353	811.71	15.566	818.99
15.107	775.90	15.098	792.18	15.170	804.97	15.333	811.45	15.545	818.90
15.087	775.61	15.078	791.89	15.150	804.75	15.313	811.16	15.525	818.65
15.067	775.31	15.058	791.58	15.130	804.48	15.293	810.92	15.504	818.43
15.047	775.00	15.038	791.35	15.110	804.20	15.272	810.67	15.484	818.22
15.028	774.66	15.018	791.06	15.090	803.95	15.252	810.41	15.463	818.02
15.008	774.36	14.998	790.77	15.070	803.62	15.232	810.17	15.443	817.74
14.988	774.10	14.978	790.45	15.050	803.39	15.212	809.89	15.422	817.55
14.968	773.70	14.958	790.20	15.030	803.14	15.191	809.67	15.402	817.35
14.948	773.40	14.938	789.87	15.010	802.86	15.171	809.35	15.381	817.08
14.928	773.14	14.918	789.58	14.990	802.62	15.151	809.11	15.361	816.86
14.908	772.80	14.899	789.32	14.970	802.26	15.131	808.83	15.340	816.65
14.888	772.45	14.879	788.99	14.950	801.99	15.110	808.57	15.320	816.38
14.868	772.16	14.859	788.74	14.930	801.77	15.090	808.29	15.299	816.14
14.848	771.86	14.839	788.40	14.910	801.46	15.070	808.03	15.279	815.93

14.828	771.50	14.819	788.17	14.890	801.21	15.050	807.78	15.258	815.71
14.808	771.11	14.799	787.84	14.870	800.91	15.030	807.48	15.238	815.44
14.788	770.87	14.779	787.55	14.850	800.59	15.009	807.20	15.217	815.19
14.768	770.55	14.759	787.27	14.830	800.39	14.989	806.97	15.197	814.96
14.749	770.20	14.739	786.94	14.810	800.09	14.969	806.72	15.176	814.75
14.729	769.90	14.719	786.63	14.790	799.81	14.949	806.41	15.156	814.54
14.709	769.58	14.699	786.34	14.770	799.56	14.928	806.18	15.135	814.24
14.689	769.26	14.679	786.05	14.750	799.27	14.908	805.86	15.115	814.02
14.669	768.90	14.660	785.72	14.730	798.92	14.888	805.59	15.094	813.73
14.649	768.56	14.640	785.49	14.710	798.65	14.868	805.36	15.074	813.50
14.629	768.23	14.620	785.17	14.689	798.36	14.848	805.01	15.053	813.27
14.609	768.01	14.600	784.88	14.669	798.09	14.827	804.73	15.033	813.03
14.589	767.60	14.580	784.55	14.649	797.81	14.807	804.50	15.012	812.80
14.569	767.20	14.560	784.26	14.629	797.49	14.787	804.23	14.992	812.49
14.549	766.95	14.540	783.93	14.609	797.22	14.767	803.89	14.971	812.24
14.529	766.61	14.520	783.63	14.589	796.96	14.746	803.64	14.951	812.00
14.509	766.30	14.500	783.31	14.569	796.62	14.726	803.37	14.930	811.76
14.489	765.92	14.480	783.04	14.549	796.35	14.706	803.08	14.910	811.52
14.470	765.52	14.460	782.71	14.529	796.07	14.686	802.80	14.889	811.28
14.450	765.26	14.440	782.38	14.509	795.80	14.665	802.52	14.869	811.02
14.430	764.94	14.421	782.08	14.489	795.49	14.645	802.24	14.848	810.74
14.410	764.60	14.401	781.80	14.469	795.20	14.625	801.97	14.828	810.48
14.390	764.20	14.381	781.48	14.449	794.91	14.605	801.65	14.807	810.16
14.370	763.80	14.361	781.16	14.429	794.63	14.585	801.37	14.787	809.91
14.350	763.56	14.341	780.85	14.409	794.30	14.564	801.11	14.766	809.65
14.330	763.20	14.321	780.53	14.389	794.01	14.544	800.76	14.746	809.40
14.310	762.80	14.301	780.22	14.369	793.73	14.524	800.53	14.725	809.15
14.290	762.40	14.281	779.92	14.349	793.45	14.504	800.25	14.705	808.90
14.270	762.10	14.261	779.55	14.329	793.15	14.483	799.97	14.684	808.60
14.250	761.80	14.241	779.28	14.309	792.84	14.463	799.66	14.664	808.30
14.230	761.40	14.221	778.93	14.289	792.52	14.443	799.38	14.643	808.03
14.210	761.10	14.202	778.64	14.269	792.23	14.423	799.07	14.622	807.76
14.191	760.65	14.182	778.27	14.249	791.89	14.403	798.78	14.602	807.49

14.171	760.30	14.162	777.97	14.229	791.65	14.382	798.49	14.581	807.21
14.151	760.00	14.142	777.59	14.209	791.27	14.362	798.16	14.561	806.94
14.131	759.63	14.122	777.34	14.189	791.01	14.342	797.87	14.540	806.68
14.111	759.30	14.102	777.01	14.169	790.75	14.322	797.59	14.520	806.41
14.091	758.90	14.082	776.67	14.149	790.43	14.301	797.31	14.499	806.14
14.071	758.54	14.062	776.34	14.129	790.09	14.281	797.00	14.479	805.86
14.051	758.20	14.042	776.06	14.109	789.79	14.261	796.72	14.458	805.56
14.031	757.82	14.022	775.70	14.089	789.45	14.241	796.45	14.438	805.30
14.011	757.50	14.002	775.32	14.069	789.19	14.220	796.12	14.417	804.94
13.991	757.10	13.982	775.03	14.049	788.85	14.200	795.79	14.397	804.68
13.971	756.70	13.963	774.71	14.029	788.54	14.180	795.51	14.376	804.48
13.951	756.36	13.943	774.40	14.009	788.24	14.160	795.20	14.356	804.12
13.931	755.99	13.923	774.00	13.989	787.86	14.140	794.96	14.335	803.84
13.912	755.60	13.903	773.68	13.969	787.59	14.119	794.66	14.315	803.55
13.892	755.23	13.883	773.39	13.949	787.25	14.099	794.30	14.294	803.25
13.872	754.90	13.863	773.05	13.929	786.95	14.079	794.01	14.274	802.95
13.852	754.50	13.843	772.68	13.909	786.66	14.059	793.72	14.253	802.65
13.832	754.10	13.823	772.38	13.889	786.36	14.038	793.42	14.233	802.41
13.812	753.66	13.803	772.04	13.869	786.01	14.018	793.13	14.212	802.13
13.792	753.27	13.783	771.65	13.849	785.66	13.998	792.81	14.192	801.80
13.772	752.96	13.763	771.29	13.829	785.34	13.978	792.50	14.171	801.51
13.752	752.60	13.743	770.92	13.809	785.05	13.958	792.23	14.151	801.23
13.732	752.20	13.724	770.62	13.789	784.72	13.937	791.88	14.130	800.94
13.712	751.81	13.704	770.28	13.769	784.33	13.917	791.55	14.110	800.64
13.692	751.40	13.684	769.93	13.749	784.04	13.897	791.27	14.089	800.34
13.672	751.00	13.664	769.58	13.729	783.75	13.877	790.95	14.069	800.03
13.652	750.63	13.644	769.17	13.709	783.39	13.856	790.66	14.048	799.70
13.633	750.28	13.624	768.87	13.689	783.02	13.836	790.31	14.028	799.38
13.613	749.90	13.604	768.47	13.669	782.74	13.816	789.97	14.007	799.13
13.593	749.47	13.584	768.10	13.649	782.37	13.796	789.68	13.987	798.81
13.573	749.10	13.564	767.73	13.629	782.04	13.776	789.33	13.966	798.51
13.553	748.70	13.544	767.41	13.609	781.74	13.755	789.01	13.946	798.21
13.533	748.39	13.524	767.00	13.589	781.38	13.735	788.75	13.925	797.90

13.513	747.90	13.504	766.65	13.569	781.03	13.715	788.42	13.905	797.56
13.493	747.50	13.485	766.32	13.549	780.69	13.695	788.07	13.884	797.24
13.473	747.10	13.465	765.91	13.529	780.37	13.674	787.75	13.864	796.93
13.453	746.67	13.445	765.55	13.509	780.04	13.654	787.38	13.843	796.68
13.433	746.27	13.425	765.13	13.489	779.71	13.634	787.11	13.823	796.36
13.413	745.81	13.405	764.80	13.469	779.38	13.614	786.80	13.802	796.03
13.393	745.40	13.385	764.48	13.449	778.99	13.593	786.44	13.782	795.69
13.374	745.00	13.365	764.07	13.429	778.73	13.573	786.13	13.761	795.43
13.354	744.58	13.345	763.73	13.409	778.35	13.553	785.79	13.741	795.10
13.334	744.16	13.325	763.34	13.389	778.04	13.533	785.43	13.720	794.77
13.314	743.80	13.305	763.01	13.369	777.63	13.513	785.10	13.700	794.45
13.294	743.40	13.285	762.58	13.349	777.32	13.492	784.73	13.679	794.12
13.274	743.00	13.265	762.20	13.329	776.94	13.472	784.41	13.659	793.86
13.254	742.50	13.246	761.85	13.309	776.59	13.452	784.06	13.638	793.47
13.234	742.10	13.226	761.45	13.289	776.25	13.432	783.73	13.618	793.15
13.214	741.70	13.206	761.06	13.269	775.90	13.411	783.43	13.597	792.83
13.194	741.28	13.186	760.65	13.249	775.51	13.391	783.06	13.577	792.49
13.174	740.88	13.166	760.27	13.229	775.13	13.371	782.67	13.556	792.21
13.154	740.40	13.146	759.86	13.209	774.84	13.351	782.36	13.536	791.87
13.134	740.00	13.126	759.54	13.189	774.50	13.331	782.01	13.515	791.52
13.114	739.58	13.106	759.11	13.169	774.11	13.310	781.67	13.495	791.25
13.095	739.12	13.086	758.78	13.149	773.77	13.290	781.34	13.474	790.91
13.075	738.69	13.066	758.37	13.129	773.33	13.270	780.95	13.454	790.56
13.055	738.20	13.046	757.98	13.109	773.02	13.250	780.60	13.433	790.22
13.035	737.70	13.027	757.60	13.089	772.69	13.229	780.24	13.412	789.96
13.015	737.30	13.007	757.26	13.069	772.31	13.209	779.94	13.392	789.54
12.995	736.80	12.987	756.84	13.049	771.96	13.189	779.64	13.371	789.18
12.975	736.30	12.967	756.50	13.029	771.55	13.169	779.22	13.351	788.89
12.955	735.85	12.947	756.01	13.009	771.16	13.148	778.88	13.330	788.57
12.935	735.40	12.927	755.62	12.989	770.84	13.128	778.54	13.310	788.21
12.915	734.92	12.907	755.22	12.969	770.43	13.108	778.16	13.289	787.86
12.895	734.46	12.887	754.79	12.949	770.05	13.088	777.82	13.269	787.52
12.875	734.00	12.867	754.38	12.929	769.73	13.068	777.45	13.248	787.23

12.855	733.53	12.847	753.97	12.909	769.30	13.047	777.12	13.228	786.87
12.835	733.10	12.827	753.51	12.889	768.94	13.027	776.68	13.207	786.51
12.816	732.60	12.807	753.10	12.869	768.53	13.007	776.34	13.187	786.17
12.796	732.20	12.788	752.67	12.849	768.19	12.987	776.01	13.166	785.79
12.776	731.77	12.768	752.26	12.829	767.82	12.966	775.63	13.146	785.46
12.756	731.30	12.748	751.78	12.809	767.44	12.946	775.27	13.125	785.13
12.736	730.90	12.728	751.39	12.789	767.03	12.926	774.88	13.105	784.76
12.716	730.40	12.708	750.93	12.769	766.62	12.906	774.54	13.084	784.39
12.696	729.90	12.688	750.51	12.749	766.26	12.886	774.29	13.064	784.09
12.676	729.45	12.668	750.11	12.729	765.89	12.865	774.02	13.043	783.69
12.656	728.90	12.648	749.67	12.709	765.52	12.845	773.62	13.023	783.39
12.636	728.42	12.628	749.24	12.689	765.13	12.825	773.30	13.002	783.01
12.616	727.89	12.608	748.82	12.669	764.67	12.805	772.92	12.982	782.62
12.596	727.40	12.588	748.36	12.649	764.30	12.784	772.57	12.961	782.31
12.576	726.90	12.568	747.92	12.629	763.91	12.764	772.21	12.941	781.90
12.556	726.40	12.549	747.53	12.609	763.49	12.744	771.88	12.920	781.57
12.537	725.90	12.529	747.08	12.589	763.10	12.724	771.73	12.900	781.23
12.517	725.40	12.509	746.69	12.569	762.72	12.703	771.37	12.879	780.84
12.497	724.90	12.489	746.24	12.548	762.30	12.683	771.01	12.859	780.50
12.477	724.40	12.469	745.75	12.528	761.93	12.663	770.68	12.838	780.14
12.457	723.90	12.449	745.32	12.508	761.50	12.643	770.29	12.818	779.80
12.437	723.47	12.429	744.94	12.488	761.08	12.623	770.01	12.797	779.37
12.417	722.90	12.409	744.42	12.468	760.68	12.602	769.78	12.777	779.03
12.397	722.34	12.389	743.99	12.448	760.27	12.582	769.48	12.756	778.59
12.377	721.83	12.369	743.55	12.428	759.85	12.562	769.11	12.736	778.29
12.357	721.30	12.349	743.06	12.408	759.42	12.542	768.77	12.715	777.86
12.337	720.89	12.329	742.66	12.388	759.03	12.521	768.45	12.695	777.50
12.317	720.36	12.310	742.14	12.368	758.61	12.501	768.13	12.674	777.14
12.297	719.86	12.290	741.62	12.348	758.16	12.481	767.78	12.654	776.79
12.277	719.32	12.270	741.14	12.328	757.72	12.461	767.38	12.633	776.38
12.258	718.80	12.250	740.69	12.308	757.37	12.441	766.96	12.613	775.99
12.238	718.29	12.230	740.18	12.288	756.92	12.420	766.70	12.592	775.64
12.218	717.80	12.210	739.69	12.268	756.47	12.400	766.31	12.572	775.22

12.198	717.23	12.190	739.23	12.248	756.04	12.380	766.04	12.551	774.81
12.178	716.67	12.170	738.75	12.228	755.61	12.360	765.59	12.531	774.47
12.158	716.10	12.150	738.20	12.208	755.16	12.339	765.21	12.510	774.07
12.138	715.60	12.130	737.63	12.188	754.69	12.319	764.83	12.490	773.71
12.118	715.05	12.110	737.18	12.168	754.26	12.299	764.58	12.469	773.27
12.098	714.40	12.090	736.67	12.148	753.84	12.279	764.21	12.449	772.88
12.078	713.90	12.071	736.18	12.128	753.38	12.258	763.80	12.428	772.46
12.058	713.30	12.051	735.65	12.108	752.97	12.238	763.35	12.408	772.06
12.038	712.70	12.031	735.15	12.088	752.52	12.218	763.03	12.387	771.68
12.018	712.20	12.011	734.68	12.068	752.00	12.198	762.59	12.367	771.26
11.998	711.67	11.991	734.18	12.048	751.62	12.178	762.22	12.346	770.84
11.979	711.00	11.971	733.70	12.028	751.21	12.157	761.92	12.326	770.45
11.959	710.44	11.951	733.23	12.008	750.70	12.137	761.59	12.305	770.07
11.939	709.90	11.931	732.77	11.988	750.25	12.117	761.19	12.285	769.64
11.919	709.30	11.911	732.23	11.968	749.81	12.097	760.78	12.264	769.24
11.899	708.68	11.891	731.71	11.948	749.36	12.076	760.38	12.244	768.82
11.879	708.20	11.871	731.19	11.928	748.89	12.056	759.98	12.223	768.41
11.859	707.64	11.851	730.69	11.908	748.40	12.036	759.59	12.203	767.98
11.839	707.00	11.832	730.12	11.888	747.94	12.016	759.15	12.182	767.62
11.819	706.49	11.812	729.63	11.868	747.49	11.996	758.74	12.161	767.21
11.799	705.84	11.792	729.10	11.848	747.02	11.975	758.39	12.141	766.76
11.779	705.20	11.772	728.63	11.828	746.51	11.955	757.90	12.120	766.31
11.759	704.60	11.752	728.32	11.808	746.05	11.935	757.54	12.100	765.92
11.739	704.00	11.732	727.91	11.788	745.55	11.915	757.19	12.079	765.50
11.719	703.40	11.712	727.46	11.768	745.11	11.894	756.75	12.059	765.08
11.700	702.80	11.692	727.02	11.748	744.58	11.874	756.31	12.038	764.66
11.680	702.10	11.672	726.57	11.728	744.08	11.854	755.86	12.018	764.19
11.660	701.60	11.652	726.09	11.708	743.61	11.834	755.43	11.997	763.76
11.640	700.85	11.632	725.67	11.688	743.14	11.813	754.98	11.977	763.40
11.620	700.13	11.613	725.17	11.668	742.64	11.793	754.54	11.956	762.96
11.600	699.50	11.593	724.71	11.648	742.09	11.773	754.17	11.936	762.49
11.580	698.97	11.573	724.17	11.628	741.67	11.753	753.65	11.915	762.04
11.560	698.20	11.553	723.71	11.608	741.20	11.733	753.28	11.895	761.59

11.540	697.56	11.533	723.25	11.588	740.66	11.712	752.74	11.874	761.15
11.520	696.90	11.513	722.70	11.568	740.09	11.692	752.37	11.854	760.71
11.500	696.28	11.493	722.11	11.548	739.66	11.672	751.93	11.833	760.28
11.480	695.85	11.473	721.64	11.528	739.14	11.652	751.44	11.813	759.80
11.460	695.37	11.453	721.15	11.508	738.64	11.631	751.01	11.792	759.38
11.440	694.77	11.433	720.53	11.488	738.08	11.611	750.58	11.772	758.87
11.421	694.34	11.413	720.01	11.468	737.59	11.591	750.16	11.751	758.47
11.401	693.76	11.393	719.45	11.448	737.00	11.571	749.63	11.731	757.99
11.381	693.19	11.374	718.90	11.428	736.52	11.551	749.14	11.710	757.50
11.361	692.53	11.354	718.36	11.408	735.98	11.530	748.66	11.690	757.05
11.341	691.82	11.334	717.81	11.388	735.40	11.510	748.17	11.669	756.60
11.321	691.22	11.314	717.20	11.368	734.90	11.490	747.63	11.649	756.13
11.301	690.60	11.294	716.56	11.348	734.34	11.470	747.15	11.628	755.62
11.281	689.92	11.274	715.95	11.328	733.82	11.449	746.74	11.608	755.16
11.261	689.32	11.254	715.43	11.308	733.28	11.429	746.20	11.587	754.70
11.241	688.59	11.234	714.79	11.288	732.69	11.409	745.73	11.567	754.21
11.221	687.84	11.214	714.20	11.268	732.14	11.389	745.29	11.546	753.73
11.201	687.13	11.194	713.58	11.248	731.60	11.369	744.78	11.526	753.25
11.181	686.44	11.174	712.96	11.228	731.08	11.348	744.27	11.505	752.76
11.162	685.70	11.154	712.26	11.208	730.53	11.328	743.76	11.485	752.28
11.142	684.95	11.135	711.60	11.188	729.96	11.308	743.27	11.464	751.77
11.122	684.17	11.115	710.96	11.168	729.30	11.288	742.79	11.444	751.27
11.102	683.36	11.095	710.35	11.148	728.75	11.267	742.18	11.423	750.80
11.082	682.53	11.075	709.65	11.128	728.20	11.247	741.73	11.403	750.31
11.062	681.78	11.055	708.98	11.108	727.61	11.227	741.09	11.382	749.80
11.042	681.01	11.035	708.30	11.088	727.08	11.207	740.65	11.362	749.30
11.022	680.18	11.015	707.70	11.068	726.50	11.186	740.07	11.341	748.82
11.002	679.41	10.995	707.02	11.048	725.87	11.166	739.61	11.321	748.26
10.982	678.60	10.975	706.29	11.028	725.29	11.146	739.01	11.300	747.77
10.962	677.77	10.955	705.60	11.008	724.66	11.126	738.54	11.280	747.25
10.942	676.89	10.935	704.88	10.988	724.04	11.106	737.96	11.259	746.74
10.922	676.12	10.915	704.16	10.968	723.44	11.085	737.42	11.239	746.24
10.902	675.32	10.896	703.40	10.948	722.80	11.065	736.88	11.218	745.71

10.883	674.33	10.876	702.78	10.928	722.24	11.045	736.27	11.198	745.18
10.863	673.44	10.856	701.99	10.908	721.57	11.025	735.72	11.177	744.66
10.843	672.57	10.836	701.25	10.888	721.00	11.004	735.09	11.157	744.09
10.823	671.73	10.816	700.52	10.868	720.38	10.984	734.60	11.136	743.55
10.803	670.77	10.796	699.80	10.848	719.72	10.964	734.00	11.116	743.06
10.783	669.87	10.776	699.05	10.828	719.10	10.944	733.49	11.095	742.49
10.763	668.95	10.756	698.27	10.808	718.41	10.924	732.90	11.075	741.97
10.743	668.05	10.736	697.54	10.788	717.80	10.903	732.28	11.054	741.40
10.723	667.15	10.716	696.81	10.768	717.11	10.883	731.58	11.034	740.87
10.703	666.30	10.696	695.99	10.748	716.41	10.863	730.97	11.013	740.33
10.683	665.34	10.676	695.25	10.728	715.80	10.843	730.40	10.993	739.73
10.663	664.44	10.657	694.44	10.708	715.15	10.822	729.88	10.972	739.19
10.643	663.40	10.637	693.67	10.688	714.46	10.802	729.14	10.952	738.63
10.623	662.71	10.617	692.90	10.668	713.79	10.782	728.56	10.931	738.04
10.604	661.86	10.597	692.03	10.648	713.14	10.762	727.94	10.910	737.45
10.584	661.20	10.577	691.21	10.628	712.45	10.741	727.42	10.890	736.86
10.564	660.44	10.557	690.37	10.608	711.74	10.721	726.78	10.869	736.27
10.544	659.50	10.537	689.63	10.588	711.07	10.701	726.18	10.849	735.75
10.524	658.67	10.517	688.83	10.568	710.37	10.681	725.46	10.828	735.08
10.504	657.72	10.497	688.02	10.548	709.70	10.661	724.81	10.808	734.53
10.484	656.87	10.477	687.17	10.528	708.97	10.640	724.14	10.787	733.97
10.464	656.02	10.457	686.31	10.508	708.27	10.620	723.44	10.767	733.35
10.444	654.96	10.438	685.46	10.488	707.54	10.600	722.87	10.746	732.74
10.424	654.00	10.418	684.62	10.468	706.80	10.580	722.25	10.726	732.17
10.404	653.11	10.398	683.66	10.448	706.11	10.559	721.54	10.705	731.57
10.384	652.13	10.378	682.86	10.428	705.38	10.539	720.87	10.685	730.95
10.364	650.99	10.358	681.88	10.407	704.61	10.519	720.22	10.664	730.34
10.344	649.99	10.338	681.00	10.387	703.88	10.499	719.45	10.644	729.71
10.325	648.99	10.318	680.13	10.367	703.15	10.479	718.72	10.623	729.10
10.305	647.96	10.298	679.14	10.347	702.40	10.458	718.05	10.603	728.50
10.285	646.83	10.278	678.28	10.327	701.61	10.438	717.41	10.582	727.84
10.265	645.65	10.258	677.32	10.307	700.85	10.418	716.72	10.562	727.14
10.245	644.48	10.238	676.33	10.287	700.06	10.398	715.94	10.541	726.54

10.225	643.37	10.218	675.35	10.267	699.24	10.377	715.29	10.521	725.91
10.205	642.14	10.199	674.36	10.247	698.44	10.357	714.55	10.500	725.24
10.185	641.03	10.179	673.33	10.227	697.58	10.337	713.83	10.480	724.55
10.165	639.62	10.159	672.40	10.207	696.80	10.317	713.02	10.459	723.94
10.145	638.45	10.139	671.42	10.187	696.04	10.296	712.24	10.439	723.27
10.125	637.19	10.119	670.33	10.167	695.16	10.276	711.52	10.418	722.61
10.105	635.93	10.099	669.36	10.147	694.32	10.256	710.74	10.398	721.89
10.085	634.61	10.079	668.22	10.127	693.50	10.236	710.07	10.377	721.25
10.065	633.21	10.059	667.17	10.107	692.66	10.216	709.27	10.357	720.56
10.046	631.87	10.039	666.23	10.087	691.71	10.195	708.48	10.336	719.84
10.026	630.56	10.019	665.09	10.067	690.88	10.175	707.67	10.316	719.11
10.006	629.14	9.999	663.99	10.047	690.03	10.155	706.85	10.295	718.49
9.986	627.91	9.979	662.92	10.027	689.07	10.135	706.09	10.275	717.76
9.966	626.40	9.960	661.90	10.007	688.18	10.114	705.19	10.254	717.01
9.946	624.90	9.940	660.73	9.987	687.31	10.094	704.42	10.234	716.30
9.926	623.55	9.920	659.58	9.967	686.38	10.074	703.65	10.213	715.55
9.906	622.02	9.900	658.43	9.947	685.42	10.054	702.78	10.193	714.88
9.886	620.45	9.880	657.30	9.927	684.45	10.034	702.07	10.172	714.12
9.866	618.84	9.860	656.07	9.907	683.49	10.013	701.16	10.152	713.35
9.846	617.33	9.840	654.86	9.887	682.56	9.993	700.33	10.131	712.68
9.826	615.76	9.820	653.60	9.867	681.58	9.973	699.44	10.111	711.86
9.806	614.16	9.800	652.36	9.847	680.62	9.953	698.52	10.090	711.10
9.786	612.46	9.780	651.10	9.827	679.62	9.932	697.68	10.070	710.33
9.767	610.70	9.760	649.71	9.807	678.62	9.912	696.69	10.049	709.56
9.747	609.17	9.740	648.42	9.787	677.56	9.892	695.81	10.029	708.75
9.727	607.41	9.721	646.97	9.767	676.50	9.872	694.93	10.008	707.96
9.707	605.69	9.701	645.58	9.747	675.42	9.851	694.04	9.988	707.15
9.687	603.87	9.681	644.14	9.727	674.36	9.831	693.09	9.967	706.32
9.667	602.05	9.661	642.65	9.707	673.29	9.811	692.16	9.947	705.53
9.647	600.23	9.641	641.12	9.687	672.07	9.791	691.08	9.926	704.66
9.627	598.18	9.621	639.68	9.667	670.98	9.771	690.22	9.906	703.86
9.607	596.41	9.601	638.14	9.647	669.91	9.750	689.26	9.885	703.02
9.587	594.39	9.581	636.50	9.627	668.71	9.730	688.16	9.865	702.23

9.567	592.27	9.561	634.87	9.607	667.47	9.710	687.20	9.844	701.25
9.547	590.20	9.541	633.21	9.587	666.30	9.690	686.28	9.824	700.44
9.527	588.08	9.521	631.55	9.567	665.10	9.669	685.16	9.803	699.55
9.507	585.84	9.501	629.87	9.547	663.79	9.649	684.22	9.783	698.62
9.488	583.70	9.482	628.20	9.527	662.60	9.629	683.16	9.762	697.78
9.468	581.26	9.462	626.67	9.507	661.30	9.609	682.11	9.742	696.75
9.448	578.91	9.442	625.00	9.487	660.04	9.589	681.00	9.721	695.88
9.428	576.40	9.422	623.34	9.467	658.78	9.568	679.86	9.700	694.90
9.408	574.16	9.402	621.72	9.447	657.44	9.548	678.79	9.680	693.96
9.388	571.62	9.382	620.10	9.427	656.13	9.528	677.71	9.659	692.94
9.368	569.12	9.362	618.44	9.407	654.75	9.508	676.54	9.639	691.95
9.348	566.61	9.342	616.84	9.387	653.40	9.487	675.41	9.618	691.05
9.328	563.77	9.322	615.28	9.367	651.96	9.467	674.27	9.598	689.96
9.308	561.05	9.302	613.57	9.347	650.54	9.447	672.99	9.577	688.94
9.288	558.10	9.282	611.72	9.327	649.07	9.427	671.86	9.557	687.90
9.268	555.23	9.262	609.84	9.307	647.61	9.406	670.65	9.536	686.85
9.248	552.37	9.243	607.95	9.287	646.01	9.386	669.46	9.516	685.81
9.228	549.40	9.223	606.07	9.267	644.48	9.366	668.20	9.495	684.76
9.209	546.21	9.203	604.09	9.247	642.84	9.346	666.97	9.475	683.64
9.189	542.98	9.183	602.00	9.227	641.20	9.326	665.66	9.454	682.54
9.169	539.60	9.163	599.87	9.207	639.42	9.305	664.27	9.434	681.37
9.149	536.30	9.143	597.83	9.187	637.72	9.285	663.06	9.413	680.33
9.129	532.89	9.123	595.53	9.167	636.04	9.265	661.60	9.393	679.11
9.109	529.14	9.103	593.39	9.147	634.31	9.245	660.22	9.372	677.96
9.089	525.52	9.083	591.16	9.127	632.51	9.224	658.83	9.352	676.74
9.069	522.04	9.063	588.67	9.107	630.71	9.204	657.39	9.331	675.52
9.049	518.21	9.043	585.98	9.087	628.87	9.184	655.94	9.311	674.42
9.029	514.16	9.024	583.49	9.067	626.88	9.164	654.49	9.290	673.09
9.009	510.23	9.004	580.65	9.047	624.82	9.144	653.02	9.270	671.92
8.989	506.32	8.984	578.09	9.027	622.75	9.123	651.48	9.249	670.63
8.969	502.42	8.964	575.96	9.007	620.81	9.103	649.88	9.229	669.27
8.950	498.20	8.944	573.57	8.987	618.80	9.083	648.33	9.208	667.92
8.930	494.05	8.924	571.08	8.967	616.47	9.063	646.78	9.188	666.57

8.910	489.52	8.904	568.44	8.947	614.25	9.042	645.16	9.167	665.13
8.890	485.49	8.884	565.46	8.927	611.88	9.022	643.45	9.147	663.90
8.870	480.93	8.864	562.44	8.907	609.37	9.002	641.68	9.126	662.45
8.850	476.24	8.844	559.15	8.887	606.76	8.982	639.88	9.106	660.92
8.830	471.77	8.824	555.56	8.867	604.27	8.961	638.11	9.085	659.49
8.810	467.00	8.804	552.24	8.847	601.57	8.941	636.03	9.065	657.92
8.790	462.31	8.785	548.34	8.827	598.90	8.921	634.28	9.044	656.45
8.770	457.29	8.765	544.18	8.807	596.06	8.901	632.28	9.024	654.89
8.750	452.29	8.745	540.12	8.787	593.09	8.881	630.08	9.003	653.13
8.730	447.40	8.725	535.50	8.767	590.13	8.860	628.24	8.983	651.62
8.710	442.56	8.705	531.00	8.747	587.14	8.840	626.08	8.962	649.90
8.690	437.21	8.685	526.36	8.727	584.06	8.820	623.96	8.942	648.14
8.671	432.26	8.665	521.37	8.707	580.59	8.800	621.51	8.921	646.43
8.651	427.42	8.645	516.00	8.687	577.09	8.779	619.25	8.901	644.63
8.631	422.39	8.625	510.55	8.667	573.14	8.759	616.75	8.880	642.65
8.611	417.52	8.605	504.50	8.647	569.33	8.739	614.34	8.860	640.70
8.591	412.39	8.585	498.63	8.627	565.16	8.719	611.77	8.839	638.93
8.571	407.52	8.565	492.91	8.607	560.92	8.699	609.04	8.819	636.82
8.551	402.71	8.546	486.47	8.587	556.51	8.678	606.39	8.798	634.81
8.531	397.61	8.526	480.21	8.567	551.77	8.658	603.18	8.778	632.44
8.511	392.63	8.506	474.09	8.547	546.53	8.638	600.12	8.757	630.28
8.491	387.63	8.486	467.69	8.527	541.28	8.618	596.81	8.737	628.13
8.471	382.86	8.466	461.00	8.507	536.13	8.597	593.68	8.716	625.84
8.451	378.20	8.446	453.87	8.487	530.54	8.577	590.01	8.696	623.30
8.431	373.46	8.426	446.45	8.467	525.77	8.557	586.53	8.675	620.72
8.411	368.59	8.406	438.94	8.447	519.61	8.537	582.66	8.655	618.77
8.392	364.10	8.386	431.80	8.427	512.59	8.517	578.41	8.634	616.74
8.372	359.82	8.366	424.43	8.407	506.35	8.496	574.25	8.614	614.71
8.352	355.40	8.346	417.32	8.387	498.80	8.476	569.69	8.593	612.40
8.332	351.19	8.326	410.70	8.367	491.70	8.456	564.53	8.573	609.66
8.312	347.09	8.307	404.08	8.347	484.56	8.436	559.54	8.552	606.96
8.292	343.04	8.287	397.27	8.327	477.10	8.415	554.80	8.532	603.83
8.272	339.07	8.267	390.91	8.307	468.69	8.395	548.61	8.511	600.41

8.252	334.95	8.247	384.66	8.287	460.12	8.375	542.29	8.491	596.83
8.232	331.30	8.227	378.57	8.267	455.41	8.355	536.00	8.470	593.58
8.212	327.53	8.207	372.45	8.246	451.49	8.334	529.10	8.449	589.51
8.192	324.01	8.187	366.34	8.226	446.58	8.314	521.04	8.429	585.25
8.172	320.44	8.167	360.46	8.206	438.81	8.294	512.63	8.408	580.92
8.152	317.03	8.147	354.70	8.186	417.75	8.274	503.61	8.388	576.22
8.132	313.63	8.127	349.44	8.166	407.63	8.254	494.81	8.367	570.89
8.113	310.38	8.107	344.21	8.146	399.50	8.233	484.52	8.347	565.22
8.093	307.15	8.087	340.55	8.126	391.93	8.213	475.63	8.326	559.21
8.073	303.94	8.068	337.14	8.106	384.33	8.193	465.98	8.306	553.21
8.053	300.91	8.048	333.62	8.086	376.87	8.173	455.98	8.285	546.10
8.033	297.94	8.028	330.17	8.066	369.86	8.152	446.31	8.265	538.57
8.013	295.10	8.008	326.47	8.046	364.65	8.132	435.63	8.244	530.42
7.993	292.67	7.988	322.91	8.026	357.96	8.112	425.52	8.224	521.05
7.973	290.20	7.968	319.12	8.006	351.66	8.092	414.50	8.203	512.12
7.953	287.77	7.948	315.44	7.986	345.65	8.072	404.42	8.183	501.31
7.933	285.49	7.928	311.85	7.966	340.19	8.051	393.96	8.162	489.18
7.913	283.04	7.908	308.27	7.946	334.52	8.031	384.36	8.142	477.84
7.893	280.66	7.888	305.04	7.926	329.50	8.011	376.06	8.121	465.19
7.873	278.34	7.868	301.71	7.906	324.69	7.991	367.65	8.101	452.94
7.853	276.02	7.848	298.32	7.886	319.95	7.970	360.00	8.080	440.54
7.834	273.72	7.829	295.18	7.866	315.56	7.950	352.48	8.060	427.36
7.814	271.52	7.809	292.04	7.846	311.20	7.930	345.74	8.039	415.63
7.794	269.32	7.789	288.80	7.826	307.19	7.910	339.36	8.019	404.19
7.774	267.19	7.769	285.90	7.806	303.26	7.889	333.69	7.998	391.93
7.754	264.90	7.749	283.03	7.786	299.52	7.869	328.24	7.978	381.16
7.734	263.02	7.729	280.23	7.766	295.87	7.849	323.18	7.957	371.40
7.714	261.13	7.709	277.29	7.746	292.57	7.829	318.22	7.937	363.66
7.694	258.97	7.689	274.75	7.726	289.28	7.809	313.48	7.916	356.43
7.674	257.03	7.669	272.07	7.706	286.08	7.788	309.09	7.896	349.30
7.654	255.22	7.649	269.48	7.686	282.95	7.768	304.95	7.875	342.36
7.634	253.36	7.629	267.24	7.666	279.85	7.748	301.05	7.855	335.96
7.614	251.44	7.610	264.81	7.646	277.09	7.728	297.26	7.834	330.27

7.594	249.60	7.590	262.53	7.626	275.01	7.707	293.51	7.814	324.97
7.574	247.73	7.570	260.05	7.606	272.50	7.687	290.16	7.793	320.02
7.555	245.77	7.550	257.92	7.586	270.24	7.667	286.86	7.773	315.36
7.535	243.87	7.530	255.62	7.566	267.91	7.647	283.62	7.752	310.99
7.515	242.13	7.510	253.69	7.546	265.45	7.627	280.54	7.732	306.61
7.495	240.45	7.490	251.39	7.526	263.28	7.606	277.59	7.711	302.59
7.475	238.67	7.470	249.33	7.506	260.96	7.586	274.61	7.691	298.66
7.455	236.93	7.450	247.52	7.486	258.80	7.566	271.95	7.670	294.93
7.435	235.27	7.430	245.57	7.466	256.62	7.546	269.25	7.650	291.46
7.415	233.74	7.410	243.43	7.446	254.48	7.525	266.71	7.629	288.08
7.395	231.88	7.390	241.69	7.426	252.32	7.505	264.14	7.609	284.81
7.375	230.32	7.371	239.66	7.406	250.11	7.485	261.66	7.588	281.60
7.355	228.85	7.351	237.87	7.386	248.06	7.465	259.29	7.568	278.50
7.335	227.25	7.331	236.13	7.366	246.06	7.444	256.81	7.547	275.57
7.315	225.63	7.311	234.14	7.346	244.09	7.424	254.55	7.527	272.62
7.295	224.11	7.291	232.50	7.326	242.17	7.404	252.34	7.506	269.83
7.276	222.62	7.271	230.92	7.306	240.10	7.384	250.10	7.486	267.10
7.256	221.07	7.251	229.17	7.286	238.15	7.364	248.05	7.465	264.40
7.236	219.60	7.231	227.35	7.266	236.40	7.343	245.91	7.445	261.85
7.216	217.95	7.211	225.72	7.246	234.57	7.323	243.83	7.424	259.32
7.196	216.19	7.191	224.22	7.226	232.80	7.303	241.90	7.404	256.92
7.176	214.58	7.171	222.50	7.206	230.98	7.283	239.87	7.383	254.51
7.156	213.09	7.151	220.86	7.186	229.30	7.262	237.98	7.363	252.24
7.136	211.72	7.132	219.52	7.166	227.55	7.242	236.10	7.342	249.97
7.116	210.28	7.112	218.04	7.146	225.89	7.222	234.20	7.322	247.72
7.096	208.88	7.092	216.33	7.126	224.25	7.202	232.37	7.301	245.57
7.076	207.51	7.072	214.93	7.106	222.45	7.182	230.60	7.281	243.51
7.056	206.14	7.052	213.49	7.086	220.80	7.161	228.81	7.260	241.40
7.036	204.89	7.032	211.88	7.066	219.37	7.141	227.02	7.239	239.33
7.016	203.60	7.012	210.35	7.046	217.78	7.121	225.36	7.219	237.43
6.997	202.31	6.992	209.07	7.026	216.17	7.101	223.65	7.198	235.52
6.977	200.99	6.972	207.10	7.006	214.72	7.080	221.95	7.178	233.57
6.957	199.85	6.952	205.62	6.986	213.18	7.060	220.32	7.157	231.70

6.937	198.60	6.932	204.23	6.966	211.73	7.040	218.73	7.137	229.88
6.917	197.41	6.912	202.87	6.946	210.10	7.020	217.19	7.116	228.06
6.897	196.23	6.893	201.53	6.926	208.64	6.999	215.58	7.096	226.24
6.877	195.01	6.873	200.25	6.906	207.30	6.979	214.08	7.075	224.49
6.857	193.78	6.853	198.94	6.886	205.89	6.959	212.52	7.055	222.79
6.837	192.77	6.833	197.48	6.866	204.43	6.939	211.02	7.034	221.08
6.817	191.61	6.813	196.32	6.846	203.07	6.919	209.57	7.014	219.46
6.797	190.46	6.793	195.24	6.826	201.76	6.898	208.06	6.993	217.81
6.777	189.38	6.773	194.01	6.806	200.33	6.878	206.64	6.973	216.21
6.757	188.26	6.753	192.82	6.786	198.99	6.858	205.28	6.952	214.60
6.738	187.13	6.733	191.69	6.766	197.74	6.838	203.84	6.932	213.11
6.718	186.05	6.713	190.45	6.746	196.05	6.817	202.46	6.911	211.47
6.698	185.00	6.693	189.28	6.726	194.81	6.797	201.09	6.891	210.02
6.678	183.91	6.673	188.15	6.706	193.53	6.777	199.78	6.870	208.50
6.658	182.83	6.654	187.13	6.686	192.23	6.757	198.44	6.850	207.04
6.638	181.79	6.634	186.02	6.666	190.98	6.737	197.09	6.829	205.51
6.618	180.73	6.614	185.00	6.646	189.81	6.716	195.79	6.809	204.13
6.598	179.70	6.594	183.84	6.626	188.56	6.696	194.31	6.788	202.72
6.578	178.78	6.574	182.74	6.606	187.42	6.676	193.03	6.768	201.33
6.558	177.72	6.554	181.66	6.586	186.36	6.656	191.84	6.747	199.92
6.538	176.66	6.534	180.60	6.566	185.27	6.635	190.57	6.727	198.60
6.518	175.68	6.514	179.56	6.546	183.97	6.615	189.29	6.706	197.15
6.498	174.83	6.494	178.46	6.526	182.93	6.595	188.18	6.686	195.85
6.478	173.78	6.474	177.43	6.506	181.72	6.575	186.99	6.665	194.55
6.459	172.78	6.454	176.37	6.486	180.55	6.554	185.76	6.645	193.22
6.439	171.89	6.435	175.35	6.466	179.46	6.534	184.62	6.624	191.93
6.419	170.80	6.415	174.29	6.446	178.58	6.514	183.50	6.604	190.68
6.399	169.83	6.395	173.33	6.426	177.47	6.494	182.32	6.583	189.39
6.379	168.89	6.375	172.35	6.406	176.31	6.474	181.19	6.563	188.14
6.359	168.08	6.355	171.33	6.386	175.27	6.453	180.00	6.542	186.93
6.339	167.14	6.335	170.39	6.366	174.38	6.433	178.89	6.522	185.68
6.319	166.17	6.315	169.44	6.346	173.36	6.413	177.78	6.501	184.51
6.299	165.30	6.295	168.41	6.326	172.30	6.393	176.64	6.481	183.32

6.279	164.40	6.275	167.40	6.306	171.26	6.372	175.55	6.460	182.08
6.259	163.33	6.255	166.44	6.286	170.11	6.352	174.57	6.440	180.93
6.239	162.54	6.235	165.66	6.266	169.35	6.332	173.47	6.419	179.80
6.219	161.48	6.215	164.65	6.246	168.27	6.312	172.40	6.399	178.65
6.199	160.57	6.196	163.67	6.226	167.34	6.292	171.36	6.378	177.55
6.180	159.73	6.176	162.78	6.206	166.40	6.271	170.37	6.358	176.43
6.160	158.90	6.156	161.86	6.186	165.37	6.251	169.28	6.337	175.23
6.140	158.04	6.136	160.86	6.166	164.43	6.231	168.32	6.317	174.20
6.120	157.20	6.116	159.91	6.146	163.33	6.211	167.30	6.296	173.10
6.100	156.31	6.096	159.13	6.126	162.47	6.190	166.28	6.276	171.96
6.080	155.44	6.076	158.23	6.105	161.54	6.170	165.25	6.255	170.88
6.060	154.41	6.056	157.32	6.085	160.60	6.150	164.28	6.235	169.79
6.040	153.61	6.036	156.38	6.065	159.68	6.130	163.25	6.214	168.74
6.020	152.82	6.016	155.47	6.045	158.69	6.110	162.30	6.194	167.72
6.000	152.01	5.996	154.58	6.025	157.61	6.089	161.32	6.173	166.66
5.980	151.22	5.976	153.69	6.005	156.85	6.069	160.41	6.153	165.66
5.960	150.33	5.957	152.86	5.985	155.97	6.049	159.42	6.132	164.64
5.940	149.52	5.937	152.07	5.965	155.19	6.029	158.52	6.112	163.57
5.920	148.60	5.917	151.21	5.945	154.27	6.008	157.60	6.091	162.58
5.901	147.70	5.897	150.31	5.925	153.35	5.988	156.61	6.071	161.58
5.881	146.92	5.877	149.46	5.905	152.43	5.968	155.60	6.050	160.61
5.861	146.23	5.857	148.62	5.885	151.47	5.948	154.69	6.030	159.60
5.841	145.49	5.837	147.74	5.865	150.55	5.927	153.84	6.009	158.65
5.821	144.61	5.817	146.86	5.845	149.57	5.907	153.00	5.988	157.68
5.801	143.72	5.797	145.97	5.825	148.64	5.887	152.05	5.968	156.72
5.781	142.86	5.777	145.08	5.805	148.05	5.867	151.17	5.947	155.72
5.761	142.04	5.757	144.22	5.785	147.04	5.847	150.24	5.927	154.83
5.741	141.29	5.737	143.44	5.765	146.24	5.826	149.37	5.906	153.87
5.721	140.67	5.718	142.80	5.745	145.54	5.806	148.40	5.886	152.94
5.701	139.93	5.698	141.78	5.725	144.71	5.786	147.51	5.865	151.98
5.681	139.15	5.678	140.94	5.705	143.88	5.766	146.72	5.845	151.09
5.661	138.31	5.658	140.16	5.685	142.97	5.745	145.86	5.824	150.20
5.641	137.58	5.638	139.68	5.665	142.17	5.725	145.05	5.804	149.27

5.622	136.80	5.618	138.84	5.645	141.37	5.705	144.26	5.783	148.39
5.602	136.05	5.598	137.99	5.625	140.52	5.685	143.33	5.763	147.48
5.582	135.35	5.578	137.20	5.605	139.67	5.665	142.39	5.742	146.61
5.562	134.45	5.558	136.42	5.585	138.94	5.644	141.65	5.722	145.73
5.542	133.58	5.538	135.67	5.565	138.21	5.624	140.88	5.701	144.82
5.522	133.02	5.518	134.94	5.545	137.00	5.604	139.93	5.681	143.96
5.502	132.28	5.498	134.18	5.525	136.21	5.584	139.11	5.660	143.12
5.482	131.59	5.479	133.36	5.505	135.46	5.563	138.37	5.640	142.27
5.462	130.89	5.459	132.56	5.485	134.94	5.543	137.56	5.619	141.39
5.442	130.15	5.439	131.86	5.465	134.05	5.523	136.78	5.599	140.55
5.422	129.36	5.419	131.17	5.445	133.30	5.503	135.94	5.578	139.70
5.402	128.66	5.399	130.15	5.425	132.63	5.482	135.17	5.558	138.90
5.382	127.95	5.379	129.49	5.405	131.86	5.462	134.37	5.537	138.02
5.362	127.12	5.359	128.91	5.385	131.09	5.442	133.58	5.517	137.21
5.343	126.31	5.339	128.17	5.365	130.32	5.422	132.74	5.496	136.43
5.323	125.66	5.319	127.43	5.345	129.48	5.402	132.00	5.476	135.55
5.303	124.86	5.299	126.66	5.325	128.73	5.381	131.26	5.455	134.81
5.283	124.36	5.279	125.90	5.305	127.98	5.361	130.49	5.435	133.92
5.263	123.45	5.259	125.22	5.285	127.23	5.341	129.71	5.414	133.16
5.243	122.86	5.240	124.54	5.265	126.48	5.321	128.97	5.394	132.35
5.223	122.10	5.220	123.81	5.245	125.77	5.300	128.11	5.373	131.53
5.203	121.36	5.200	123.04	5.225	125.07	5.280	127.38	5.353	130.76
5.183	120.86	5.180	122.30	5.205	124.29	5.260	126.59	5.332	130.06
5.163	119.99	5.160	121.62	5.185	123.41	5.240	125.83	5.312	129.21
5.143	119.34	5.140	120.95	5.165	122.59	5.220	125.19	5.291	128.42
5.123	118.61	5.120	120.02	5.145	121.86	5.199	124.42	5.271	127.70
5.103	118.02	5.100	119.47	5.125	121.20	5.179	123.72	5.250	126.91
5.083	117.23	5.080	118.89	5.105	120.73	5.159	123.02	5.230	126.15
5.064	116.79	5.060	118.20	5.085	120.08	5.139	122.14	5.209	125.37
5.044	116.13	5.040	117.52	5.065	119.37	5.118	121.51	5.189	124.63
5.024	115.41	5.021	116.87	5.045	118.57	5.098	120.68	5.168	123.79
5.004	114.71	5.001	116.16	5.025	117.81	5.078	120.04	5.148	123.08
4.984	114.15	4.981	115.45	5.005	117.23	5.058	119.37	5.127	122.35

4.964	113.50	4.961	114.55	4.985	116.55	5.037	118.67	5.107	121.62
4.944	112.81	4.941	113.96	4.965	115.84	5.017	117.88	5.086	120.85
4.924	112.18	4.921	113.36	4.945	115.13	4.997	117.21	5.066	120.16
4.904	111.35	4.901	112.53	4.925	114.46	4.977	116.56	5.045	119.47
4.884	110.87	4.881	111.91	4.905	113.79	4.957	115.78	5.025	118.69
4.864	110.16	4.861	111.26	4.885	113.09	4.936	115.12	5.004	117.97
4.844	109.62	4.841	110.59	4.865	112.38	4.916	114.35	4.984	117.26
4.824	108.97	4.821	109.96	4.845	111.70	4.896	113.72	4.963	116.56
4.804	108.30	4.801	109.35	4.825	111.07	4.876	113.08	4.943	115.85
4.785	107.71	4.782	108.72	4.805	110.44	4.855	112.31	4.922	115.16
4.765	107.09	4.762	108.00	4.785	109.80	4.835	111.68	4.902	114.46
4.745	106.46	4.742	107.42	4.765	109.16	4.815	111.03	4.881	113.75
4.725	105.85	4.722	106.83	4.745	108.40	4.795	110.28	4.861	113.05
4.705	105.14	4.702	106.14	4.725	107.62	4.775	109.66	4.840	112.35
4.685	104.39	4.682	105.46	4.705	107.08	4.754	109.10	4.820	111.65
4.665	103.95	4.662	104.86	4.685	106.48	4.734	108.34	4.799	110.96
4.645	103.19	4.642	104.28	4.665	105.65	4.714	107.70	4.778	110.34
4.625	102.56	4.622	103.68	4.645	105.03	4.694	107.05	4.758	109.63
4.605	102.09	4.602	103.01	4.625	104.63	4.673	106.36	4.737	108.97
4.585	101.54	4.582	102.34	4.605	103.98	4.653	105.75	4.717	108.31
4.565	100.91	4.562	101.77	4.585	103.33	4.633	105.12	4.696	107.59
4.545	100.16	4.543	101.19	4.565	102.66	4.613	104.48	4.676	106.97
4.526	99.69	4.523	100.60	4.545	102.05	4.592	103.80	4.655	106.33
4.506	99.07	4.503	100.00	4.525	101.45	4.572	103.22	4.635	105.61
4.486	98.43	4.483	99.40	4.505	100.85	4.552	102.53	4.614	104.98
4.466	97.79	4.463	98.80	4.485	100.23	4.532	101.94	4.594	104.34
4.446	97.29	4.443	98.14	4.465	99.61	4.512	101.25	4.573	103.70
4.426	96.73	4.423	97.61	4.445	99.01	4.491	100.71	4.553	103.05
4.406	96.05	4.403	96.95	4.425	98.40	4.471	99.96	4.532	102.36
4.386	95.41	4.383	96.40	4.405	97.46	4.451	99.41	4.512	101.72
4.366	94.91	4.363	95.87	4.385	97.12	4.431	98.78	4.491	101.12
4.346	94.43	4.343	95.26	4.365	96.57	4.410	98.18	4.471	100.47
4.326	93.84	4.323	94.62	4.345	95.96	4.390	97.56	4.450	99.83

4.306	93.09	4.304	94.07	4.325	95.20	4.370	96.95	4.430	99.17
4.286	92.63	4.284	93.52	4.305	94.61	4.350	96.34	4.409	98.58
4.266	92.07	4.264	92.90	4.285	94.06	4.330	95.67	4.389	97.92
4.247	91.51	4.244	92.22	4.265	93.34	4.309	95.15	4.368	97.27
4.227	91.01	4.224	91.75	4.245	92.72	4.289	94.54	4.348	96.68
4.207	90.45	4.204	91.23	4.225	92.17	4.269	93.92	4.327	96.09
4.187	89.87	4.184	90.67	4.205	91.82	4.249	93.31	4.307	95.48
4.167	89.37	4.164	90.08	4.185	91.22	4.228	92.67	4.286	94.84
4.147	88.82	4.144	89.51	4.165	90.62	4.208	92.13	4.266	94.24
4.127	88.19	4.124	88.95	4.145	90.03	4.188	91.60	4.245	93.65
4.107	87.62	4.104	88.39	4.125	89.43	4.168	90.98	4.225	93.03
4.087	87.07	4.084	87.82	4.105	88.89	4.147	90.27	4.204	92.37
4.067	86.51	4.065	87.25	4.085	88.36	4.127	89.73	4.184	91.78
4.047	86.02	4.045	86.64	4.065	87.81	4.107	89.23	4.163	91.21
4.027	85.41	4.025	86.15	4.045	87.26	4.087	88.64	4.143	90.63
4.007	84.96	4.005	85.59	4.025	86.63	4.067	88.06	4.122	90.03
3.987	84.37	3.985	85.02	4.005	86.01	4.046	87.49	4.102	89.41
3.968	83.80	3.965	84.53	3.985	85.49	4.026	86.84	4.081	88.87
3.948	83.26	3.945	83.97	3.965	84.80	4.006	86.29	4.061	88.26
3.928	82.63	3.925	83.40	3.944	84.22	3.986	85.80	4.040	87.66
3.908	82.03	3.905	82.87	3.924	83.81	3.965	85.15	4.020	87.08
3.888	81.61	3.885	82.35	3.904	83.24	3.945	84.61	3.999	86.55
3.868	80.99	3.865	81.82	3.884	82.73	3.925	84.06	3.979	85.95
3.848	80.63	3.845	81.27	3.864	82.22	3.905	83.48	3.958	85.41
3.828	80.13	3.826	80.67	3.844	81.67	3.885	82.93	3.938	84.80
3.808	79.51	3.806	80.04	3.824	81.12	3.864	82.34	3.917	84.24
3.788	79.02	3.786	79.43	3.804	80.53	3.844	81.77	3.897	83.68
3.768	78.51	3.766	79.03	3.784	79.86	3.824	81.27	3.876	83.10
3.748	77.93	3.746	78.61	3.764	79.50	3.804	80.72	3.856	82.52
3.728	77.47	3.726	78.05	3.744	78.93	3.783	80.16	3.835	81.96
3.708	76.94	3.706	77.45	3.724	78.36	3.763	79.63	3.815	81.40
3.689	76.30	3.686	76.91	3.704	77.79	3.743	79.12	3.794	80.79
3.669	75.91	3.666	76.41	3.684	77.24	3.723	78.53	3.774	80.29

3.649	75.39	3.646	75.91	3.664	76.75	3.702	78.03	3.753	79.72
3.629	74.80	3.626	75.41	3.644	76.25	3.682	77.52	3.733	79.15
3.609	74.33	3.607	74.91	3.624	75.63	3.662	76.86	3.712	78.65
3.589	73.82	3.587	74.41	3.604	75.05	3.642	76.35	3.692	78.08
3.569	73.31	3.567	73.77	3.584	74.71	3.622	75.88	3.671	77.52
3.549	72.76	3.547	73.31	3.564	74.13	3.601	75.37	3.651	76.96
3.529	72.20	3.527	72.85	3.544	73.52	3.581	74.82	3.630	76.44
3.509	71.79	3.507	72.31	3.524	73.15	3.561	74.28	3.610	75.86
3.489	71.27	3.487	71.77	3.504	72.60	3.541	73.78	3.589	75.35
3.469	70.74	3.467	71.29	3.484	71.99	3.520	73.25	3.569	74.77
3.449	70.30	3.447	70.81	3.464	71.39	3.500	72.63	3.548	74.26
3.429	69.83	3.427	70.33	3.444	71.00	3.480	72.18	3.527	73.75
3.410	69.25	3.407	69.85	3.424	70.57	3.460	71.71	3.507	73.16
3.390	68.72	3.387	69.36	3.404	70.05	3.440	71.16	3.486	72.67
3.370	68.39	3.368	68.83	3.384	69.56	3.419	70.62	3.466	72.13
3.350	67.85	3.348	68.34	3.364	69.04	3.399	70.14	3.445	71.60
3.330	67.39	3.328	67.77	3.344	68.51	3.379	69.58	3.425	71.07
3.310	66.86	3.308	67.16	3.324	67.86	3.359	69.10	3.404	70.54
3.290	66.29	3.288	66.67	3.304	67.41	3.338	68.62	3.384	70.02
3.270	65.94	3.268	66.18	3.284	67.00	3.318	68.04	3.363	69.48
3.250	65.38	3.248	65.89	3.264	66.42	3.298	67.55	3.343	69.02
3.230	64.94	3.228	65.36	3.244	66.04	3.278	67.10	3.322	68.48
3.210	64.46	3.208	64.87	3.224	65.49	3.258	66.54	3.302	67.95
3.190	63.91	3.188	64.43	3.204	64.99	3.237	66.05	3.281	67.43
3.170	63.42	3.168	63.89	3.184	64.51	3.217	65.59	3.261	66.93
3.150	62.95	3.148	63.41	3.164	64.07	3.197	65.07	3.240	66.45
3.131	62.53	3.129	62.93	3.144	63.60	3.177	64.59	3.220	65.90
3.111	62.04	3.109	62.33	3.124	63.06	3.156	64.05	3.199	65.42
3.091	61.55	3.089	61.94	3.104	62.43	3.136	63.60	3.179	64.93
3.071	61.14	3.069	61.54	3.084	61.94	3.116	63.06	3.158	64.37
3.051	60.65	3.049	61.05	3.064	61.49	3.096	62.61	3.138	63.88
3.031	60.20	3.029	60.56	3.044	61.18	3.075	62.07	3.117	63.39
3.011	59.71	3.009	60.10	3.024	60.62	3.055	61.60	3.097	62.89

2.991	59.23	2.989	59.62	3.004	60.08	3.035	61.12	3.076	62.39
2.971	58.78	2.969	59.12	2.984	59.71	3.015	60.62	3.056	61.88
2.951	58.30	2.949	58.68	2.964	59.26	2.995	60.14	3.035	61.37
2.931	57.83	2.929	58.17	2.944	58.76	2.974	59.70	3.015	60.91
2.911	57.40	2.909	57.60	2.924	58.28	2.954	59.18	2.994	60.41
2.891	56.91	2.890	57.25	2.904	57.70	2.934	58.72	2.974	59.89
2.871	56.51	2.870	56.75	2.884	57.21	2.914	58.26	2.953	59.41
2.852	56.03	2.850	56.36	2.864	56.73	2.893	57.76	2.933	58.92
2.832	55.51	2.830	55.91	2.844	56.36	2.873	57.21	2.912	58.46
2.812	55.06	2.810	55.43	2.824	55.95	2.853	56.82	2.892	57.93
2.792	54.71	2.790	54.96	2.804	55.48	2.833	56.35	2.871	57.45
2.772	54.14	2.770	54.46	2.784	55.00	2.813	55.82	2.851	56.98
2.752	53.71	2.750	53.96	2.764	54.55	2.792	55.36	2.830	56.50
2.732	53.34	2.730	53.61	2.744	54.10	2.772	54.92	2.810	56.03
2.712	52.86	2.710	53.13	2.724	53.65	2.752	54.42	2.789	55.54
2.692	52.28	2.690	52.71	2.704	53.16	2.732	53.96	2.769	55.04
2.672	51.89	2.670	52.25	2.684	52.71	2.711	53.52	2.748	54.62
2.652	51.49	2.651	51.81	2.664	52.25	2.691	53.02	2.728	54.17
2.632	51.06	2.631	51.31	2.644	51.77	2.671	52.62	2.707	53.65
2.612	50.59	2.611	50.78	2.624	51.25	2.651	52.10	2.687	53.20
2.592	50.15	2.591	50.48	2.604	50.80	2.630	51.63	2.666	52.68
2.573	49.68	2.571	49.99	2.584	50.35	2.610	51.18	2.646	52.23
2.553	49.27	2.551	49.61	2.564	49.95	2.590	50.74	2.625	51.76
2.533	48.85	2.531	49.15	2.544	49.46	2.570	50.31	2.605	51.30
2.513	48.41	2.511	48.66	2.524	49.12	2.550	49.84	2.584	50.82
2.493	47.89	2.491	48.17	2.504	48.60	2.529	49.36	2.564	50.32
2.473	47.55	2.471	47.73	2.484	48.18	2.509	48.96	2.543	49.88
2.453	47.09	2.451	47.35	2.464	47.73	2.489	48.46	2.523	49.40
2.433	46.63	2.432	46.96	2.444	47.30	2.469	48.05	2.502	48.99
2.413	46.22	2.412	46.45	2.424	46.87	2.448	47.56	2.482	48.48
2.393	45.77	2.392	45.99	2.404	46.43	2.428	47.14	2.461	48.02
2.373	45.38	2.372	45.61	2.384	45.95	2.408	46.67	2.441	47.56
2.353	44.94	2.352	45.10	2.364	45.47	2.388	46.25	2.420	47.12

2.333	44.47	2.332	44.73	2.344	45.07	2.368	45.78	2.400	46.66
2.314	44.07	2.312	44.32	2.324	44.70	2.347	45.38	2.379	46.20
2.294	43.64	2.292	43.89	2.304	44.23	2.327	44.94	2.359	45.75
2.274	43.21	2.272	43.46	2.284	43.83	2.307	44.48	2.338	45.28
2.254	42.85	2.252	43.04	2.264	43.39	2.287	44.02	2.318	44.86
2.234	42.43	2.232	42.58	2.244	42.87	2.266	43.57	2.297	44.39
2.214	41.96	2.212	42.10	2.224	42.53	2.246	43.16	2.276	43.94
2.194	41.59	2.193	41.74	2.204	42.04	2.226	42.72	2.256	43.50
2.174	41.10	2.173	41.34	2.184	41.61	2.206	42.26	2.235	43.08
2.154	40.73	2.153	40.88	2.164	41.21	2.185	41.85	2.215	42.59
2.134	40.28	2.133	40.42	2.144	40.85	2.165	41.42	2.194	42.17
2.114	39.90	2.113	40.04	2.124	40.36	2.145	41.00	2.174	41.72
2.094	39.48	2.093	39.61	2.104	39.96	2.125	40.55	2.153	41.25
2.074	39.06	2.073	39.23	2.084	39.48	2.105	40.10	2.133	40.81
2.054	38.61	2.053	38.82	2.064	39.07	2.084	39.66	2.112	40.37
2.035	38.21	2.033	38.37	2.044	38.65	2.064	39.28	2.092	39.93
2.015	37.83	2.013	37.98	2.024	38.26	2.044	38.83	2.071	39.50
1.995	37.43	1.993	37.58	2.004	37.84	2.024	38.41	2.051	39.04
1.975	36.97	1.973	37.13	1.984	37.40	2.003	37.98	2.030	38.58
1.955	36.58	1.954	36.72	1.964	37.00	1.983	37.51	2.010	38.20
1.935	36.18	1.934	36.32	1.944	36.60	1.963	37.15	1.989	37.78
1.915	35.79	1.914	35.89	1.924	36.09	1.943	36.72	1.969	37.33
1.895	35.38	1.894	35.46	1.904	35.76	1.923	36.30	1.948	36.91
1.875	34.97	1.874	35.10	1.884	35.38	1.902	35.86	1.928	36.45
1.855	34.53	1.854	34.67	1.864	34.96	1.882	35.43	1.907	36.03
1.835	34.11	1.834	34.25	1.844	34.51	1.862	35.03	1.887	35.60
1.815	33.70	1.814	33.86	1.824	34.08	1.842	34.62	1.866	35.17
1.795	33.30	1.794	33.45	1.803	33.68	1.821	34.20	1.846	34.74
1.775	32.90	1.774	33.03	1.783	33.30	1.801	33.76	1.825	34.30
1.756	32.50	1.754	32.62	1.763	32.87	1.781	33.35	1.805	33.93
1.736	32.12	1.734	32.22	1.743	32.47	1.761	32.93	1.784	33.48
1.716	31.75	1.715	31.77	1.723	31.99	1.740	32.55	1.764	33.03
1.696	31.36	1.695	31.47	1.703	31.68	1.720	32.12	1.743	32.63

1.676	30.96	1.675	31.01	1.683	31.28	1.700	31.73	1.723	32.25
1.656	30.55	1.655	30.66	1.663	30.87	1.680	31.30	1.702	31.90
1.636	30.13	1.635	30.26	1.643	30.45	1.660	30.89	1.682	31.47
1.616	29.70	1.615	29.84	1.623	30.07	1.639	30.50	1.661	31.03
1.596	29.33	1.595	29.47	1.603	29.67	1.619	30.05	1.641	30.60
1.576	28.90	1.575	29.03	1.583	29.24	1.599	29.66	1.620	30.15
1.556	28.51	1.555	28.63	1.563	28.86	1.579	29.26	1.600	29.77
1.536	28.12	1.535	28.31	1.543	28.46	1.558	28.86	1.579	29.31
1.516	27.76	1.515	27.91	1.523	28.09	1.538	28.46	1.559	28.90
1.496	27.41	1.495	27.43	1.503	27.69	1.518	28.03	1.538	28.49
1.477	26.98	1.476	27.13	1.483	27.28	1.498	27.61	1.518	28.08
1.457	26.60	1.456	26.71	1.463	26.86	1.478	27.24	1.497	27.74
1.437	26.20	1.436	26.31	1.443	26.48	1.457	26.88	1.477	27.30
1.417	25.82	1.416	25.93	1.423	26.09	1.437	26.42	1.456	26.86
1.397	25.44	1.396	25.54	1.403	25.69	1.417	26.02	1.436	26.49
1.377	25.04	1.376	25.18	1.383	25.36	1.397	25.62	1.415	26.06
1.357	24.70	1.356	24.77	1.363	24.93	1.376	25.29	1.395	25.65
1.337	24.30	1.336	24.40	1.343	24.54	1.356	24.86	1.374	25.25
1.317	23.90	1.316	23.98	1.323	24.17	1.336	24.45	1.354	24.86
1.297	23.49	1.296	23.64	1.303	23.79	1.316	24.06	1.333	24.44
1.277	23.10	1.276	23.27	1.283	23.40	1.295	23.66	1.313	24.08
1.257	22.75	1.256	22.85	1.263	23.01	1.275	23.33	1.292	23.63
1.237	22.40	1.237	22.48	1.243	22.61	1.255	22.91	1.272	23.26
1.217	22.00	1.217	22.11	1.223	22.27	1.235	22.51	1.251	22.87
1.198	21.65	1.197	21.74	1.203	21.86	1.215	22.12	1.231	22.41
1.178	21.25	1.177	21.32	1.183	21.51	1.194	21.73	1.210	22.04
1.158	20.80	1.157	20.98	1.163	21.11	1.174	21.36	1.190	21.66
1.138	20.48	1.137	20.57	1.143	20.70	1.154	20.96	1.169	21.28
1.118	20.07	1.117	20.20	1.123	20.31	1.134	20.57	1.149	20.89
1.098	19.70	1.097	19.79	1.103	19.92	1.113	20.22	1.128	20.49
1.078	19.33	1.077	19.46	1.083	19.59	1.093	19.81	1.108	20.11
1.058	19.00	1.057	19.13	1.063	19.21	1.073	19.41	1.087	19.67
1.038	18.60	1.037	18.66	1.043	18.81	1.053	19.09	1.066	19.33

1.018	18.20	1.018	18.33	1.023	18.43	1.033	18.65	1.046	18.92
0.998	17.80	0.998	17.99	1.003	18.06	1.012	18.31	1.025	18.52
0.978	17.43	0.978	17.55	0.983	17.72	0.992	17.92	1.005	18.14
0.958	17.10	0.958	17.26	0.963	17.33	0.972	17.53	0.984	17.76
0.938	16.72	0.938	16.88	0.943	16.96	0.952	17.15	0.964	17.35
0.919	16.32	0.918	16.48	0.923	16.60	0.931	16.74	0.943	17.01
0.899	16.00	0.898	16.13	0.903	16.21	0.911	16.41	0.923	16.57
0.879	15.60	0.878	15.77	0.883	15.87	0.891	16.03	0.902	16.22
0.859	15.22	0.858	15.38	0.863	15.50	0.871	15.66	0.882	15.83
0.839	14.90	0.838	15.03	0.843	15.09	0.851	15.26	0.861	15.42
0.819	14.50	0.818	14.69	0.823	14.75	0.830	14.90	0.841	15.07
0.799	14.18	0.798	14.31	0.803	14.39	0.810	14.53	0.820	14.70
0.779	13.80	0.779	13.93	0.783	13.98	0.790	14.14	0.800	14.30
0.759	13.47	0.759	13.53	0.763	13.62	0.770	13.81	0.779	13.92
0.739	13.10	0.739	13.16	0.743	13.25	0.749	13.36	0.759	13.58
0.719	12.70	0.719	12.84	0.723	12.88	0.729	13.04	0.738	13.20
0.699	12.36	0.699	12.50	0.703	12.52	0.709	12.72	0.718	12.79
0.679	12.00	0.679	12.08	0.683	12.14	0.689	12.28	0.697	12.41
0.659	11.60	0.659	11.71	0.663	11.82	0.668	11.89	0.677	12.05
0.640	11.30	0.639	11.42	0.643	11.43	0.648	11.55	0.656	11.69
0.620	10.90	0.619	11.09	0.623	11.05	0.628	11.19	0.636	11.30
0.600	10.61	0.599	10.71	0.603	10.75	0.608	10.76	0.615	10.92
0.580	10.18	0.579	10.32	0.583	10.35	0.588	10.42	0.595	10.55
0.560	9.90	0.559	9.97	0.563	10.00	0.567	10.07	0.574	10.16
0.540	9.54	0.540	9.62	0.543	9.64	0.547	9.69	0.554	9.82
0.520	9.19	0.520	9.26	0.523	9.28	0.527	9.31	0.533	9.43
0.500	8.75	0.500	8.90	0.503	8.92	0.507	8.98	0.513	9.04
0.480	8.48	0.480	8.50	0.483	8.53	0.486	8.64	0.492	8.67
0.460	8.11	0.460	8.18	0.463	8.17	0.466	8.25	0.472	8.33
0.440	7.77	0.440	7.81	0.443	7.78	0.446	7.88	0.451	7.93
0.420	7.34	0.420	7.49	0.423	7.46	0.426	7.53	0.431	7.55
0.400	7.04	0.400	7.15	0.403	7.04	0.406	7.15	0.410	7.23
0.380	6.69	0.380	6.78	0.383	6.74	0.385	6.82	0.390	6.84

0.361	6.30	0.360	6.43	0.363	6.39	0.365	6.44	0.369	6.52
0.341	6.00	0.340	6.05	0.343	6.03	0.345	6.09	0.349	6.13
0.321	5.67	0.320	5.69	0.323	5.66	0.325	5.73	0.328	5.81
0.301	5.30	0.301	5.40	0.303	5.31	0.304	5.42	0.308	5.42
0.281	4.90	0.281	5.03	0.283	4.94	0.284	5.03	0.287	5.08
0.261	4.60	0.261	4.68	0.263	4.61	0.264	4.69	0.267	4.71
0.241	4.23	0.241	4.35	0.243	4.25	0.244	4.32	0.246	4.36
0.221	3.88	0.221	3.98	0.223	3.95	0.223	4.10	0.226	4.01
0.201	3.50	0.201	3.61	0.203	3.66	0.203	3.56	0.205	3.61
0.181	3.19	0.181	3.30	0.183	3.35	0.183	3.34	0.185	3.30
0.161	2.84	0.161	2.99	0.163	2.96	0.163	2.96	0.164	2.91
0.141	2.48	0.141	2.61	0.143	2.55	0.143	2.57	0.144	2.53
0.121	2.15	0.121	2.29	0.123	2.15	0.122	2.15	0.123	2.20
0.102	1.80	0.101	1.89	0.103	1.81	0.102	1.81	0.103	1.82

Table S4.

Normalized parameters, X/X_0 , in pipeline design and operation. Symbols are the same that in Table 5. Symbols without subscript refer to the mixture, and subscript "0" indicates pure CO₂.

Normalized parameter		Conditions	Formula
normalized inner diameter	$\frac{D}{D_0}$	given mas flow given velocity	$\frac{D}{D_0} = \left(\frac{\rho_0}{\rho}\right)^{0.5}$
normalized erosional velocity	$\frac{v_E}{v_{E_0}}$	assuming the same C (Table 5)	$\frac{v_E}{v_{E_0}} = \left(\frac{\rho_0}{\rho}\right)^{0.5}$
normalized velocity	$\frac{v}{v_0}$	given mas flow given pipeline inner diameter	$\frac{v}{v_0} = \frac{\rho_0}{\rho}$
normalized Reynolds number	$\frac{Re}{Re_0}$	given mas flow given pipeline inner diameter	$\frac{Re}{Re_0} = \frac{\rho \times \mu_0}{\rho_0 \times \mu}$
normalized booster capacity	$\frac{W}{W_0}$	given mas flow given booster configuration	$\frac{W}{W_0} = \frac{\rho_0}{\rho}$
normalized mass flow	$\frac{m}{m_0}$	given pipeline inner diameter given velocity	$\frac{m}{m_0} = \frac{\rho}{\rho_0}$
normalized Darcy-Weisbach friction factor	$\frac{f}{f_0}$	$m = 317 \text{ kg/s} = 10 \text{ Mt/year}$ $D = 0.508 \text{ m} = 20 \text{ inch}$ $e = 4.6 \times 10^{-5} \text{ m} = 0.00015 \text{ ft}$	$\frac{f}{f_0} = \frac{\left[\ln \left[\frac{e}{3.7 \times D} + \frac{5.74}{Re^{0.9}} \right] \right]^2}{\left[\ln \left[\frac{e}{3.7 \times D} + \frac{5.74}{Re_0^{0.9}} \right] \right]^2}$
normalized pressure drop per metre	$\frac{\Delta P/L}{(\Delta P/L)_0}$	$m = 317 \text{ kg/s} = 10 \text{ Mt/year}$ $D = 0.508 \text{ m} = 20 \text{ inch}$ $e = 0.00015 \text{ ft}$	$\frac{\Delta P/L}{(\Delta P/L)_0} = \frac{f \times \rho_0}{f_0 \times \rho}$

Table S5. Normalized parameters for the transport of CO₂ + CH₄ or CO₂ + CO mixtures ($x_{\text{CO}_2} \cong 0.97$), for selected pressures and $T = 304.21$ and 308.15 K.

$P(\text{MPa})$	(1) $\frac{D}{D_0}$	(2) $\frac{v_E}{v_{E_0}}$	(3) $\frac{v}{v_0}$	(4) $\frac{Re}{Re_0}$	(5) $\frac{W}{W_0}$	(6) $\frac{m}{m_0}$	(7) $\frac{f}{f_0}$	(8) $\frac{\Delta P/L}{(\Delta P/L)_0}$
CO ₂ + CH ₄ ($x_{\text{CO}_2} = 0.9719$, $T = 304.21$ K)								
8.6	1.069	1.069	1.144	1.213	1.144	0.8745	0.9975	1.141
9.0	1.054	1.054	1.111	1.171	1.111	0.8998	0.9979	1.109
10.0	1.039	1.039	1.078	1.128	1.078	0.9272	0.9983	1.077
11.0	1.032	1.032	1.065	1.109	1.065	0.9387	0.9984	1.064
12.0	1.029	1.029	1.059	1.098	1.059	0.9446	0.9985	1.057
13.0	1.026	1.026	1.053	1.091	1.053	0.9495	0.9986	1.052
15.0	1.023	1.023	1.046	1.081	1.046	0.9556	0.9987	1.045
20.0	1.020	1.020	1.040	1.069	1.040	0.9619	0.9987	1.038
CO ₂ + CH ₄ ($x_{\text{CO}_2} = 0.9719$, $T = 308.15$ K)								
8.6	1.166	1.166	1.360	1.465	1.360	0.7351	0.9962	1.355
9.0	1.097	1.097	1.203	1.277	1.203	0.8312	0.9972	1.200
10.0	1.053	1.053	1.109	1.156	1.109	0.9017	0.9981	1.107
11.0	1.041	1.041	1.085	1.121	1.085	0.9219	0.9984	1.083
12.0	1.035	1.035	1.071	1.105	1.071	0.9337	0.9985	1.069
13.0	1.031	1.031	1.064	1.095	1.064	0.9402	0.9986	1.062
15.0	1.027	1.027	1.054	1.083	1.054	0.9489	0.9987	1.052
20.0	1.022	1.022	1.044	1.069	1.044	0.9582	0.9988	1.042
CO ₂ + CO ($x_{\text{CO}_2} = 0.9700$, $T = 304.21$ K)								
8.6	1.110	1.110	1.231	1.420	1.231	0.8121	0.9958	1.226
9.0	1.078	1.078	1.162	1.291	1.162	0.8609	0.9967	1.158
10.0	1.051	1.051	1.105	1.190	1.105	0.9053	0.9975	1.102
11.0	1.041	1.041	1.083	1.153	1.083	0.9233	0.9979	1.081
12.0	1.035	1.035	1.070	1.133	1.070	0.9342	0.9981	1.068
13.0	1.030	1.030	1.062	1.120	1.062	0.9417	0.9982	1.060
15.0	1.025	1.025	1.052	1.104	1.052	0.9509	0.9983	1.050
20.0	1.020	1.020	1.039	1.086	1.039	0.9621	0.9984	1.038
CO ₂ + CO ($x_{\text{CO}_2} = 0.9700$, $T = 308.15$ K)								
8.6	1.228	1.228	1.508	1.752	1.508	0.6631	0.9948	1.500
9.0	1.141	1.141	1.302	1.547	1.302	0.7679	0.9954	1.296
10.0	1.065	1.065	1.134	1.252	1.134	0.8821	0.9972	1.130
11.0	1.046	1.046	1.095	1.179	1.095	0.9131	0.9977	1.093
12.0	1.038	1.038	1.078	1.147	1.078	0.9278	0.9980	1.076
13.0	1.033	1.033	1.066	1.129	1.066	0.9379	0.9982	1.064
15.0	1.026	1.026	1.053	1.108	1.053	0.9499	0.9983	1.051
20.0	1.020	1.020	1.040	1.086	1.040	0.9619	0.9985	1.038

⁽¹⁾(pipeline inner diameter for mixture transportation) / (pipeline inner diameter for pure CO₂ transportation), for a given mass flow and velocity.

- ⁽²⁾ (erosional velocity for mixture transportation) / (erosional velocity for pure CO₂ transportation), assuming the same C (Table 5).
- ⁽³⁾ (velocity for mixture transportation) / (velocity for pure CO₂ transportation), for a given mass flow and pipeline inner diameter.
- ⁽⁴⁾ (Reynolds number for mixture transportation) / (Reynolds number for pure CO₂ transportation), for a given mass flow and pipeline inner diameter.
- ⁽⁵⁾ (booster capacity for mixture recompression) / (booster capacity for pure CO₂ recompression), for a given mass flow and booster configuration.
- ⁽⁶⁾ (mass flow for mixture transportation) / (mass flow for pure CO₂ transportation), for a given pipeline inner diameter and velocity.
- ⁽⁷⁾ (Darcy-Weisbach friction factor for mixture transportation) / (Darcy-Weisbach friction factor for pure CO₂ transportation), for a mass flow of 317 kg/s (10 Mt/year), a pipeline inner diameter of 0.508 m (20 inch) and a roughness height of 4.6×10^{-5} m (0.00015 ft).
- ⁽⁸⁾ (pressure drop per metre for mixture transportation) / (pressure drop per metre for pure CO₂ transportation), for a mass flow of 317 kg/s (10 Mt/year), a pipeline inner diameter of 0.508 m (20 inch) and a roughness height of 4.6×10^{-5} m (0.00015 ft).

Fig. S1. Experimental setup to measure volumetric properties of fluids: (1) loading cell, (2) nitrogen, (3) manual pump, (4) densimeter, (5) vibrating tube output, (6) rupture disk, (7) thermoregulated pressure transducers, (8) platinum temperature probe, (9) externally connected liquid thermoregulated bath, (10) liquid bath, (11) evaluation unit and data acquisition, (12) evacuation and vacuum line.

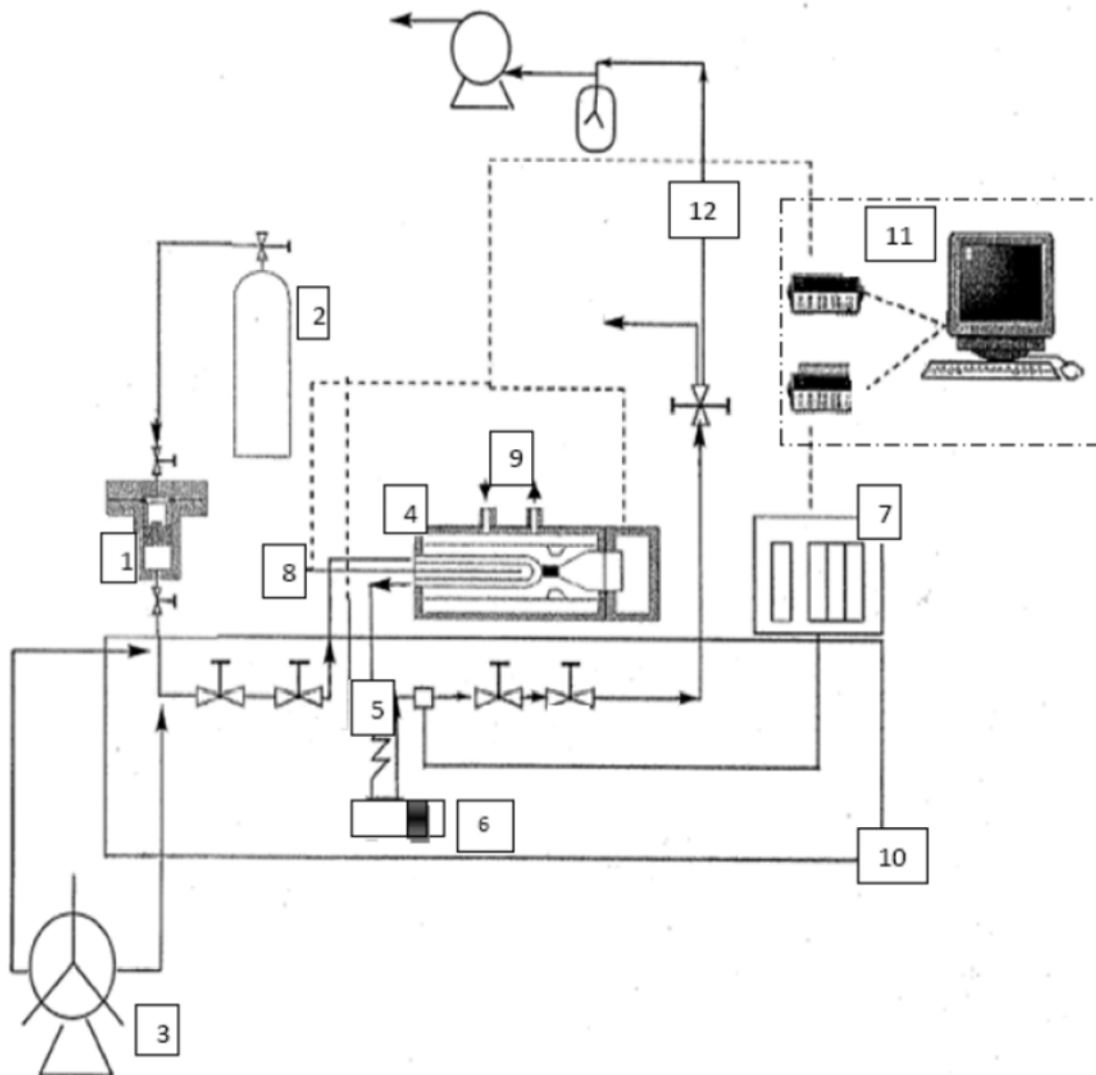


Fig. S2. Comparison between $\bar{V}_2 - P$ literature data and calculated in this work for $\{\text{CO}_2(1) + \text{CH}_4(2)\}$ system at $T = 308.15 \text{ K}$ and $x_{\text{CO}_2} \cong 0.996$ mole fraction.

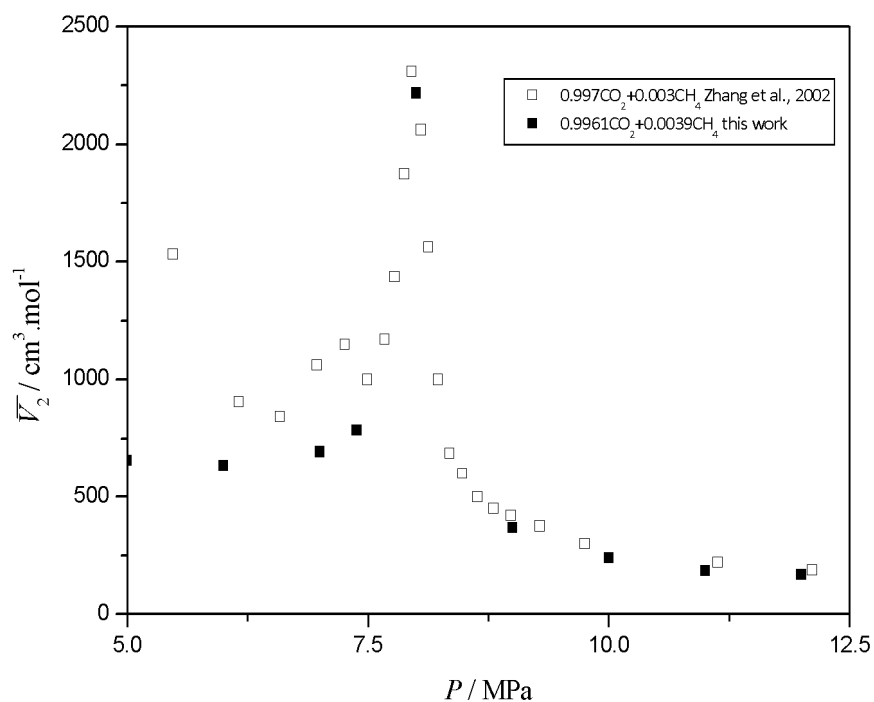


Fig. S3. Solute partial molar volume at infinite dilution, \bar{V}_2^∞ , versus density of the pure solvent, ρ_{CO_2} , for the $\{\text{CO}_2(1) + \text{CH}_4(2)\}$ and $\{\text{CO}_2(1) + \text{CO}(2)\}$ systems at $T = 304.21 \text{ K}$ and $T = 308.15 \text{ K}$.

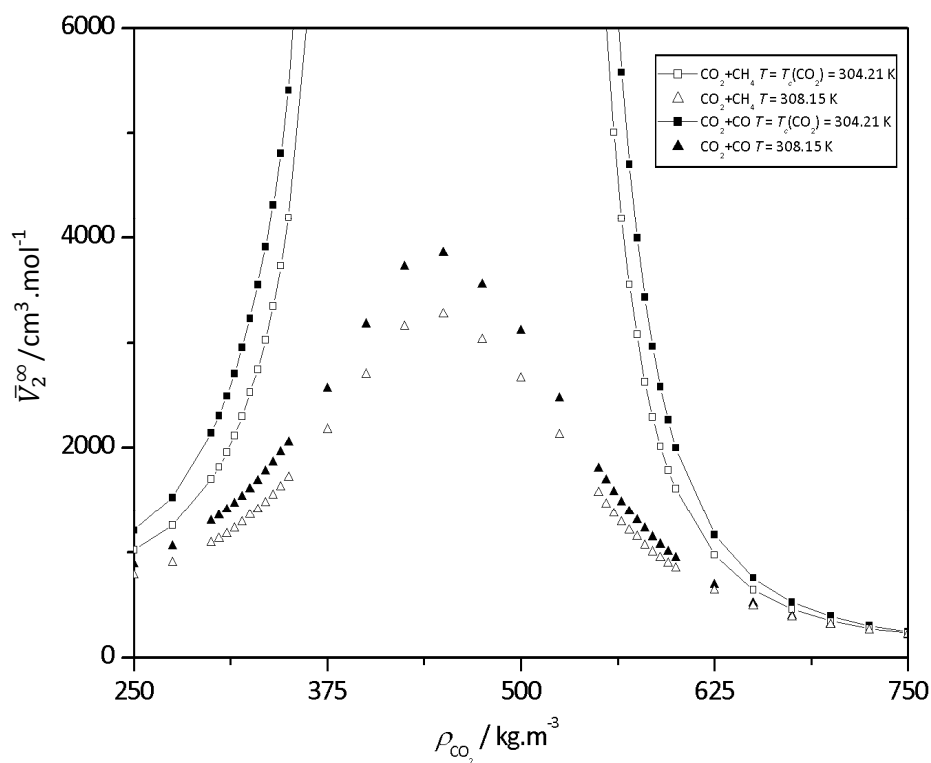


Fig. S4. Direct correlation function integrals differences for solvent-solvent (1-1) and solvent-solute (1-2) pair interactions, $(C_{11} - C_{12})$, versus density of the pure solvent, ρ_{CO_2} , at $T = 304.21$ and 308.15 K.

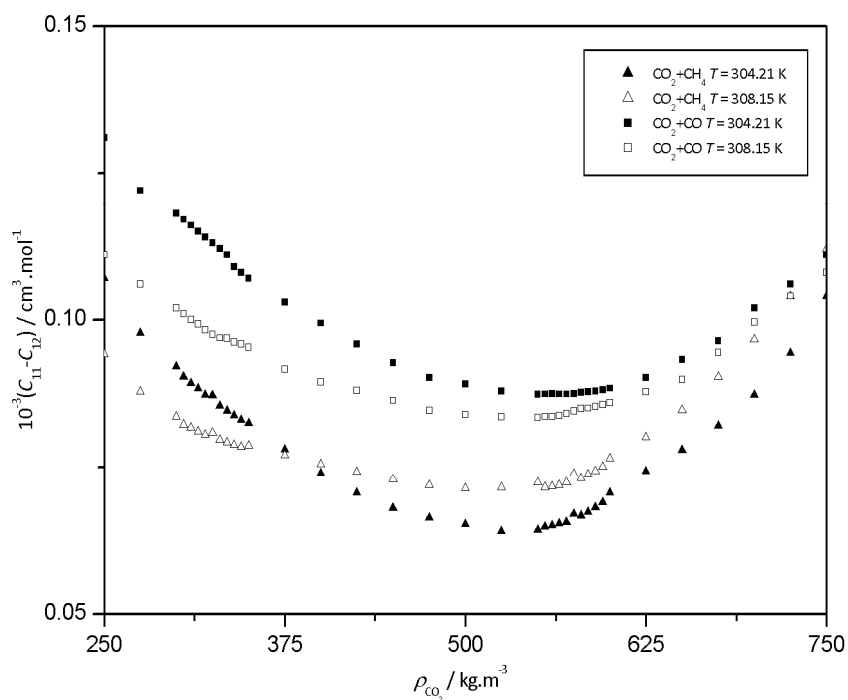


Fig. S5. Excess coordination number, N_{exc}^∞ , versus density of the pure solvent, ρ_{CO_2} , for the $\{\text{CO}_2(1) + \text{CH}_4(2)\}$ and $\{\text{CO}_2(1) + \text{CO}(2)\}$ systems at $T = 304.21$ K and $T = 308.15$ K.

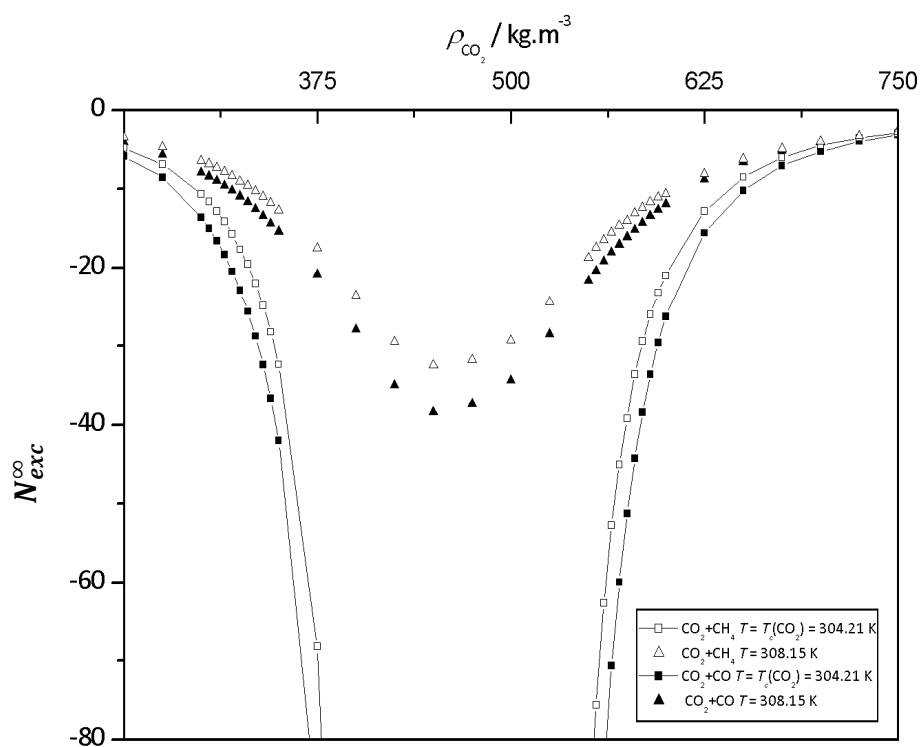


Fig. S6. Comparison of normalized transport velocity, v/v_0 , (for a given mass flow and pipeline inner diameter) or normalized booster capacity for fluid recompression, W/W_0 , (for a given mass flow and booster configuration) for mixtures $\text{CO}_2 + \text{CH}_4$ or $+ \text{CO}$ with $x_{\text{CO}_2} \cong 0.97$.

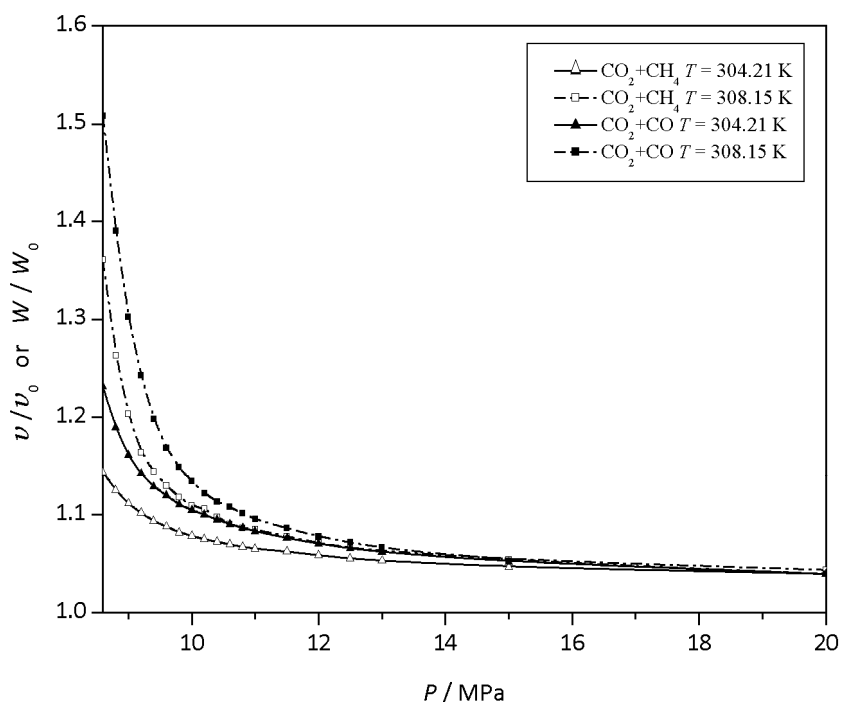


Fig. S7. Comparison of normalized Reynolds number, Re/Re_0 , (for a given mass flow and pipeline inner diameter) for mixtures $\text{CO}_2 + \text{CH}_4$ or $+ \text{CO}$ with $x_{\text{CO}_2} \cong 0.97$.

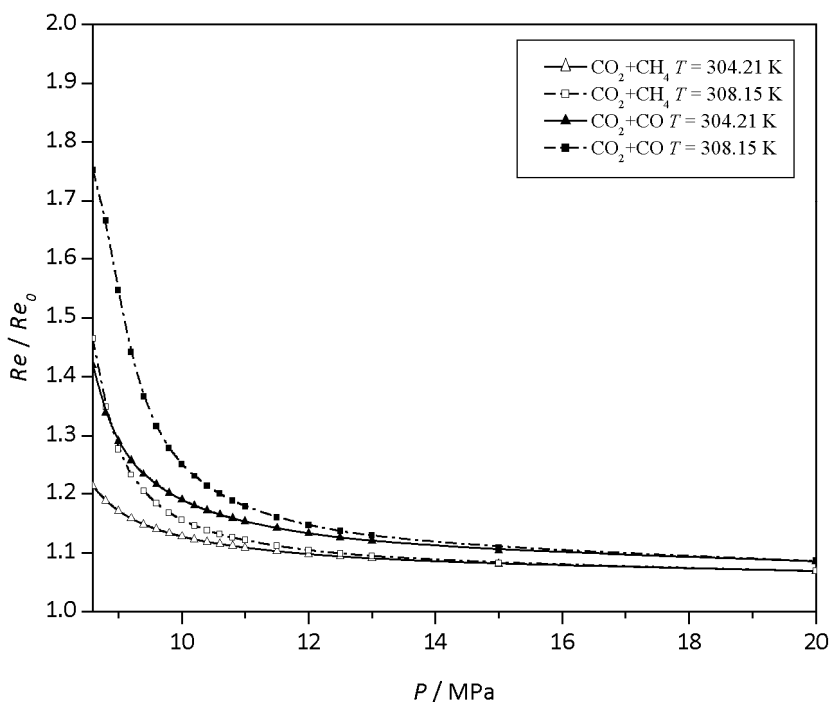


Fig. S8 Comparison of normalized mass flow, m/m_0 , (for a given pipeline inner diameter and transport velocity) for mixtures $\text{CO}_2 + \text{CH}_4$ or $+\text{CO}$ with $x_{\text{CO}_2} \cong 0.97$.

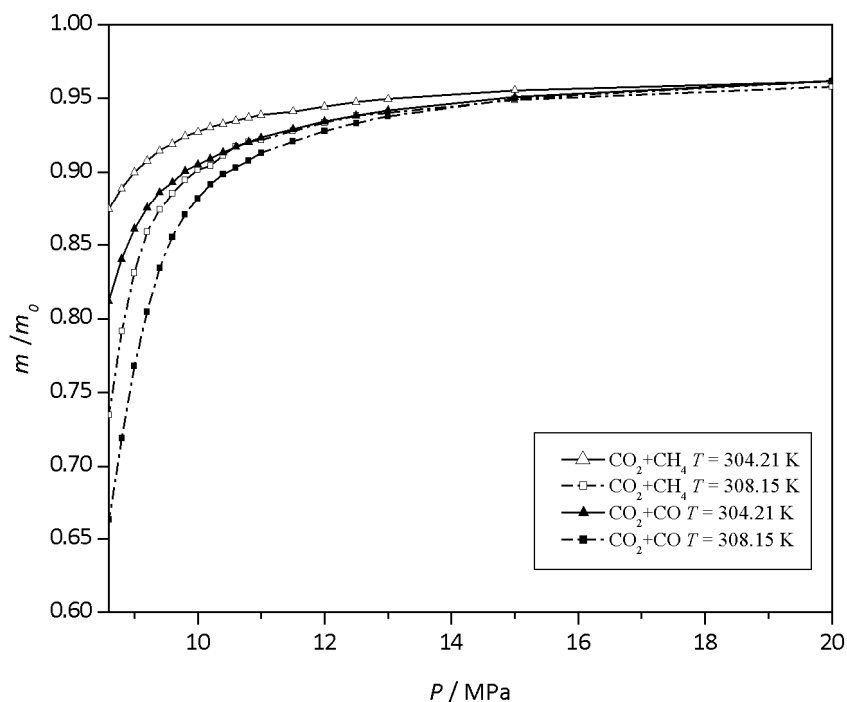


Fig. S9. Comparison of normalized Darcy-Weisbach friction factor, f/f_0 , for a mass flow of 317 kg/s (10 Mt/year), a pipeline inner diameter of 0.508 m (20 inch) and a roughness height of 4.6×10^{-5} m (0.00015 ft) for mixtures $\text{CO}_2 + \text{CH}_4$ or $+\text{CO}$ with $x_{\text{CO}_2} \cong 0.97$.

