## THE OPEN UNIVERSITY OF SRI LANKA DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING DIPLOMA IN INFORMATION SYSTEMS AND TECHNOLOGY ECZ3262 - MATHEMATICS



**CLOSED BOOK** 



[6]

Date: Sunday, 27 November 2016

**Time:** 0930 - 1230 hrs

## READ THE FOLLOWING INSTRUCTIONS BEFORE ANSWERING THE PAPER

## **Instructions:**

- 1. Answer any five out of eight questions.
- 2. Show intermediate steps clearly.
- 3. Programmable calculators are not allowed.
- 4. Total marks obtaining for this examination is 100. The marks assigned for each question is in square brackets.

 $\mathbf{Q}\mathbf{1}$ 

(a) Find which of the following propositions are tautologies, contradictions or neither.

i) 
$$(p \leftrightarrow q) \leftrightarrow (P \to Q) \land (Q \to P)$$

ii) 
$$(p \lor q) \land [(\neg p) \land (\neg q)]$$

iii) 
$$(p \rightarrow q) \lor (q \rightarrow p)$$

(b) Use DE Morgan's theorem to simplify the following expressions. [6]

i) 
$$\overline{A + BC + AB}$$
  
ii)  $\overline{(x + z)(xy)}$ 

ii) ) 
$$(x+z)(xy)$$

(c) Minimize the following using the Karnaugh maps method (first constructs the truth table and then find the simplified Boolean expression for the given expression). [8]

$$R = \overline{ABC} + \overline{AB} + AB\overline{C} + AC$$

[6]

Q2

(a) i) Solve 
$$\begin{pmatrix} 3 & 2 \\ -1 & 1 \end{pmatrix} + X = \begin{pmatrix} 1 & 0 \\ -1 & 2 \end{pmatrix}$$
, where X is a matrix. [3]

ii) Show that 
$$A = \begin{pmatrix} 0 & 0 \\ 1 & 3 \end{pmatrix}$$
 has no inverse. [3]

(b) Compute the following, if possible, for the given matrices.

$$A = \begin{pmatrix} -4 & 2 & 3 \\ 0 & 5 & -1 \\ 6 & 1 & -2 \end{pmatrix} \qquad B = \begin{pmatrix} 6 & -1 & 0 \\ 2 & 2 & -4 \\ 3 & -1 & 1 \end{pmatrix} \qquad C = \begin{pmatrix} 5 & -1 \\ -3 & 4 \end{pmatrix}$$

$$D = \begin{pmatrix} -7 & 1 & -4 \\ 3 & -2 & 8 \end{pmatrix} \qquad E = \begin{pmatrix} 3 & -3 & 5 \\ 1 & 0 & -2 \\ 6 & 7 & -2 \end{pmatrix}$$

iii) 
$$A^T + E^T$$

$$x_1 - 2x_2 - 3x_3 = 0$$
$$2x_2 + x_3 = -8$$
$$-x_1 + x_2 + 2x_3 = 3$$

sec x

Q3

ii) 
$$2x + \frac{1}{x^2}$$

(b) Find 
$$\frac{d}{dx}$$
 as a function of x for followings. [6]  
i)  $e^{5x^2+7x-13}$  ii)  $x^2 \sin^3(5x)$  iii)  $\frac{1+\ln x}{x^2-\ln x}$ 

i) 
$$e^{5x^2+7x-13}$$
 ii)  $x^2 \sin^3(5x)$  iii)  $\frac{1+\ln x}{x^2-\ln x}$ 

(c) Show that 
$$y = \cos^3 x \tan x$$
 satisfies  $\cos x \frac{dy}{dx} + 3y \sin x - \cos^2 x = 0$ 

Q4

[6]

i) 
$$\int x^2 e^{3x} dx$$

ii) 
$$\int x \cos 3x dx$$

i) 
$$\int x^2 e^{3x} dx$$
 ii)  $\int x \cos 3x dx$  iii)  $\int x^4 \ln x dx$ 

(b) Evaluate following definite integrals.

[8]

i) 
$$\int_{0}^{\frac{\pi}{3}} \frac{\cos x + \cos x \tan^2 x}{2\sec^2 x} dx$$

(b) If 
$$\int_{0}^{\frac{\pi}{3}} \frac{\cos x + \cos x \tan^{2} x}{2 \sec^{2} x} dx$$
 iii) 
$$\int_{0}^{2} x(x^{2} - 1)^{7} dx$$
 iii) 
$$\int_{1}^{4} \frac{x^{3} - 8}{\sqrt{x}} dx$$
 (b) If 
$$\int_{0}^{\frac{\pi}{2}} x \sin x dx = \int_{0}^{2} (kx^{2} + 2x) dx$$
 find the value of **k**.

(b) If 
$$\int_{0}^{\frac{\pi}{2}} x \sin x dx = \int_{0}^{2} (kx^{2} + 2x) dx$$

[6]

Q5

[6]

i) 
$$\cot x + \tan x = \sec x \cdot \csc x$$

ii) 
$$\frac{1+\cos x + \cos 2x}{\sin x + \sin 2x} = \cot x$$

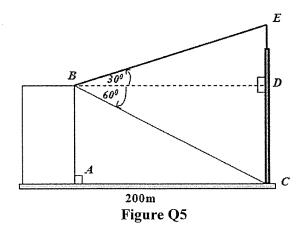
iii) 
$$\frac{(\tan x + \sec x - 1)}{(\tan x - \sec x + 1)} = \frac{(1 + \sin x)}{\cos x}$$

(b) i) Calculate the trigonometric ratios of sin15° and cos15°, by using the trigonometric ratio values of 45° and 30°

[4]

ii) A block of flats is 200 m away from a cellphone tower. Someone stands at B and measure the angle from B (top of the flat which is at a lower level than tower top) to the top of the tower E to be 30° (the angle of elevation) as shown in Figure Q5. Then they measure the angle from B to the bottom of the tower C to be 60° (the angle of depression). What is the height of the cellphone tower (Height of CE)?

[2]



(c) Sketch the graphs of the following functions for the values of x lying between 0 and  $2\pi$ .

ii) 
$$y = -3\sin\left(\frac{1}{2}x\right)$$

[8]

[6]

Q6

(a) If 
$$2\cos x = \left(x + \frac{1}{x}\right)$$
 then prove that  $\cos 3x = \frac{1}{2}(x^3 + \frac{1}{x^3})$  and  $\cos 6x = \frac{1}{2}\left(x^6 + \frac{1}{x^6}\right)$  [6]

(b) (i) Given the statistical distribution of the table. Calculate the mode, median,

mean, range, variance and standard deviation.

,	variance and Standard deviation.								
	Xi	61	64	67	70	73			
	$\mathbf{f_i}$	5	18	42	27	8			

(ii) The following table shows the recorded high temperatures for each of the 50 states in US. Construct a histogram and a frequency polygon to represent data. [3]

Class Boundaries	Frequency
99.5 - 104.5	2
104.5 – 109.5	8
109.5 – 114.5	18
114.5 – 119.5	13
119.5 – 124.5	7
124.5 – 129.5	1
- 129.5 – 134.5	1

(c) ABC (PVT) LTD has a contract to assemble components for a waste water management system to be used by the Sri Lankan government. The time required to complete one part of the assembly is thought to be normally distributed, with a mean of 30 hours and a standard deviation of 4.7 hours. Find the probability that the assembly steps completed between 26 and 35 hours. [5]

 $\mathbf{Q7}$ 

- (a) Bernad tries to read 240 pages of her book every day. One week (7 days) she only managed to read 200 pages. What was the percentage error?[4]
- (b) The sales of the Maclak (PVT) LTD for last five years is given in the table below. Estimate the sales for the year 1979. Use the Newton-Gregory formula of backward interpolation for the calculation.
  [8]

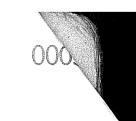
Year	1974	1976	1978	1980	1982
Sales (in lacks)	40	43	48	52	57

(c) A continuous random variable, X has the probability density function, f(x) as  $f(x) = \begin{cases} 0.5x & ; 0 \le x \le 2 \\ 0 & ; x < 0 \quad or \quad x > 0 \end{cases}$ 

Find the followings of the random variable X:

[8]

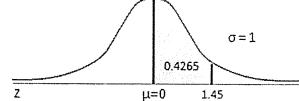
i) Expected value, E(X) ii) Variance, V(X)



- (a) There is a huge cone with the dimensions as; radius of 4 meters and height of 18 meters. You would be able to fill the cone with water at a rate of 3 cubic meters every 50 minutes. How long will it take you to fill the cone? [8]
- (b) In a hospital union claimed nurses earned LKR 45000 with a standard deviation of 3000. A recent sample of 120 nurses found the mean income to be LKR 45500. At the  $\alpha = 0.01$  level of significance; then can we conclude the mean income is not equal to LKR 45000. Explain briefly. Find the p-value. (Assume the system has a normal distribution) [12]

## Areas Under the One-Tailed Standard Normal Curve

This table provides the area between the mean and some Z score. For example, when Z score = 1.45 the area = 0.4265.



0.0         0.0000         0.0404         0.0880         0.0120         0.0160         0.0199         0.0239         0.0279         0.0319         0.035           0.1         0.0398         0.0438         0.0478         0.0517         0.0557         0.0596         0.0636         0.0675         0.0714         0.075           0.2         0.0793         0.0832         0.0871         0.0910         0.0948         0.0987         0.1026         0.1044         0.1103         0.114           0.3         0.1179         0.1217         0.1255         0.1293         0.1331         0.1368         0.1404         0.1443         0.1480         0.154           0.4         0.1554         0.1591         0.1628         0.1664         0.1700         0.1736         0.1772         0.1808         0.1844         0.187           0.5         0.1915         0.1950         0.1935         0.2019         0.2054         0.2088         0.2123         0.2159         0.2222           0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.254           0.7         0.2580         0.2611         0.2642			r		·	<u> </u>	·	μ=υ	1.45		·
0.1         0.0398         0.0438         0.0478         0.0517         0.0557         0.0596         0.0636         0.0675         0.0714         0.075           0.2         0.0793         0.0832         0.0871         0.0910         0.0948         0.0987         0.1026         0.1064         0.1103         0.114           0.3         0.1179         0.1217         0.1255         0.1293         0.1331         0.1368         0.1406         0.1443         0.1480         0.151           0.4         0.1554         0.1591         0.1628         0.1664         0.1700         0.1736         0.1772         0.1808         0.1444         0.187           0.5         0.1915         0.1595         0.1928         0.2019         0.2054         0.2088         0.2123         0.2157         0.2190         0.2222           0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.2580           0.7         0.2580         0.2611         0.2642         0.2673         0.2794         0.2734         0.2744         0.2794         0.2794         0.2823         0.2825           0.8         0.2811 <t< th=""><th>ļ</th><th></th><th><b>}</b></th><th><del> </del></th><th>ļ</th><th><del></del></th><th><del> </del></th><th>ļ</th><th>0.07</th><th>0.08</th><th>0.09</th></t<>	ļ		<b>}</b>	<del> </del>	ļ	<del></del>	<del> </del>	ļ	0.07	0.08	0.09
0.2         0.0793         0.0832         0.0871         0.0910         0.0948         0.0987         0.1026         0.1064         0.1103         0.114           0.3         0.1179         0.1217         0.1255         0.1293         0.1331         0.1368         0.1406         0.1443         0.1480         0.151           0.4         0.1554         0.1591         0.1628         0.1664         0.1700         0.1736         0.1772         0.1808         0.1844         0.187           0.5         0.1915         0.1950         0.1985         0.2019         0.2054         0.2088         0.2123         0.2157         0.2190         0.222           0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.258           0.8         0.2611         0.2642         0.2673         0.2704         0.2734         0.2764         0.2794         0.2823         0.285           0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0			<del>}</del>	<del> </del>	<del>{</del>		<del> </del>	<del> </del>	0.0279	0.0319	0.0359
0.3         0.1179         0.1217         0.1255         0.1293         0.1331         0.1368         0.1406         0.1443         0.1480         0.151           0.4         0.1554         0.1591         0.1628         0.1664         0.1700         0.1736         0.1772         0.1808         0.1844         0.187           0.5         0.1915         0.1950         0.1985         0.2019         0.2054         0.2088         0.2123         0.2157         0.2190         0.222           0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.254           0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0.3238         0.3264         0.3289         0.3315         0.3340         0.3365         0.338           1.0         0.3413         0.3438         0.3461         0.3485         0.3538         0.3551         0.3577         0.3599         0.362           1.1         0.3643         0.3665         0.3686         0				ļ			0.0596	0.0636	0.0675	0.0714	0.0753
0.4         0.1554         0.1591         0.1628         0.1664         0.1700         0.1736         0.1772         0.1808         0.1844         0.1870           0.5         0.1915         0.1950         0.1985         0.2019         0.2054         0.2088         0.2123         0.2157         0.2190         0.222           0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.254           0.7         0.2580         0.2611         0.2642         0.2673         0.2704         0.2734         0.2764         0.2794         0.2823         0.2853           0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0.3238         0.3508         0.3531         0.3340         0.3365         0.3381           1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3574         0.3577         0.3599           1.1         0.3643         0.3665         0.3686         0.3708         <	<u> </u>		<b>}</b>	<b>}</b>	<del> </del>	<del> </del>		0.1026	0.1064	0.1103	0.1141
0.5         0.1915         0.1950         0.1985         0.2019         0.2054         0.2088         0.2123         0.2157         0.2190         0.222           0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.254           0.7         0.2580         0.2611         0.2642         0.2673         0.2704         0.2734         0.2764         0.2794         0.2823         0.285           0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0.3238         0.3508         0.3531         0.3540         0.3565         0.338           1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3577         0.3599         0.362           1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.383           1.2         0.3849         0.3869         0.3888         0.3907         0			<del></del>	<del>}</del>	<del> </del>	<del> </del>	0.1368	0.1406	0.1443	0.1480	0.1517
0.6         0.2257         0.2291         0.2324         0.2357         0.2389         0.2422         0.2454         0.2486         0.2517         0.254           0.7         0.2580         0.2611         0.2642         0.2673         0.2704         0.2734         0.2764         0.2794         0.2823         0.285           0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0.3238         0.3264         0.3289         0.3315         0.3340         0.3365         0.338           1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3577         0.3599         0.362           1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.383           1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.4011           1.3         0.4032         0.4049         0.4066			<del></del>	<del> </del>		<del> </del>	0.1736	0.1772	0.1808	0.1844	0.1879
0.7         0.2580         0.2611         0.2642         0.2673         0.2704         0.2734         0.2764         0.2794         0.2823         0.285           0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0.3238         0.3264         0.3289         0.3315         0.3340         0.3365         0.338           1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3554         0.3577         0.3599         0.362           1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.383           1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.401           1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0			<del></del>	<del> </del>	<del></del>	<del> </del>	0.2088	0.2123	0.2157	0.2190	0.2224
0.8         0.2881         0.2910         0.2939         0.2967         0.2995         0.3023         0.3051         0.3078         0.3106         0.313           0.9         0.3159         0.3186         0.3212         0.3238         0.3264         0.3289         0.3315         0.3340         0.3365         0.338           1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3554         0.3577         0.3599         0.3622           1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.383           1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.401           1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345			0.2291	<b>}</b>	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.9         0.3159         0.3186         0.3212         0.3238         0.3264         0.3289         0.3315         0.3340         0.3365         0.338           1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3554         0.3577         0.3599         0.362           1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.383           1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.401           1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4444           1.6         0.4452         0.4463				}	[	-	0.2734	0.2764	0.2794	0.2823	0.2852
1.0         0.3413         0.3438         0.3461         0.3485         0.3508         0.3531         0.3554         0.3577         0.3599         0.3622           1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.383           1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.401           1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4441           1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4541           1.7         0.4554         0.4564 <t< td=""><td></td><td></td><td>0.2910</td><td>0.2939</td><td>0.2967</td><td>0.2995</td><td>0.3023</td><td>0.3051</td><td>0.3078</td><td>0.3106</td><td>0.3133</td></t<>			0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
1.1         0.3643         0.3665         0.3686         0.3708         0.3729         0.3749         0.3770         0.3790         0.3810         0.3831           1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.401           1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4441           1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4544           1.7         0.4454         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.463           1.8         0.4641         0.4664 <t< td=""><td>0.9</td><td>0.3159</td><td>0.3186</td><td>0.3212</td><td>0.3238</td><td>0.3264</td><td>0.3289</td><td>0.3315</td><td>0.3340</td><td>0.3365</td><td>0.3389</td></t<>	0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.2         0.3849         0.3869         0.3888         0.3907         0.3925         0.3944         0.3962         0.3980         0.3997         0.401           1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4442           1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4544           1.7         0.4554         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.463           1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4706           2.0         0.4772         0.4778 <t< td=""><td></td><td></td><td>0.3438</td><td>0.3461</td><td>0.3485</td><td>0.3508</td><td>0.3531</td><td>0.3554</td><td>0.3577</td><td>0.3599</td><td>0.3621</td></t<>			0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.3         0.4032         0.4049         0.4066         0.4082         0.4099         0.4115         0.4131         0.4147         0.4162         0.417           1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4444           1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4544           1.7         0.4554         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.463           1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4761           1.9         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.481           2.0         0.4872         0.4873 <t< td=""><td>1.1</td><td>0.3643</td><td>0.3665</td><td>0.3686</td><td>0.3708</td><td>0.3729</td><td>0.3749</td><td>0.3770</td><td>0.3790</td><td>0.3810</td><td>0.3830</td></t<>	1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.4         0.4192         0.4207         0.4222         0.4236         0.4251         0.4265         0.4279         0.4292         0.4306         0.431           1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4444           1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4545           1.7         0.4554         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.4633           1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4761           1.9         0.4713         0.4719         0.4726         0.4732         0.4738         0.4744         0.4750         0.4761         0.4761           2.0         0.4772         0.4778         0.4783         0.4793         0.4798         0.4803         0.4808         0.4812         0.4812           2.1         0.4821         0.4826         0.4830         0.4834				0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.5         0.4332         0.4345         0.4357         0.4370         0.4382         0.4394         0.4406         0.4418         0.4429         0.4442           1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4545           1.7         0.4554         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.463           1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4701           1.9         0.4713         0.4719         0.4726         0.4732         0.4738         0.4744         0.4750         0.4756         0.4761         0.4766           2.0         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.4851           2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4851           2.2         0.4861         0.4864         0.4868	1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.6         0.4452         0.4463         0.4474         0.4484         0.4495         0.4505         0.4515         0.4525         0.4535         0.4545           1.7         0.4554         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.4633           1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4706           1.9         0.4713         0.4719         0.4726         0.4732         0.4738         0.4744         0.4750         0.4756         0.4761         0.4766           2.0         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.481           2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4851           2.2         0.4861         0.4864         0.4868         0.4871         0.4875         0.4878         0.4881         0.4884         0.4887         0.4891           2.3         0.4893         0.4920         0.4922	1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.7         0.4554         0.4564         0.4573         0.4582         0.4591         0.4599         0.4608         0.4616         0.4625         0.4633           1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4700           1.9         0.4713         0.4719         0.4726         0.4732         0.4738         0.4744         0.4750         0.4756         0.4761         0.4766           2.0         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.4812           2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4854         0.4851           2.2         0.4861         0.4864         0.4868         0.4871         0.4875         0.4878         0.4881         0.4884         0.4887         0.4896           2.3         0.4893         0.4896         0.4992         0.4904         0.4906         0.4909         0.4911         0.4913         0.4913           2.4         0.4918         0.4920         0.4922	1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.8         0.4641         0.4649         0.4656         0.4664         0.4671         0.4678         0.4686         0.4693         0.4699         0.4700           1.9         0.4713         0.4719         0.4726         0.4732         0.4738         0.4744         0.4750         0.4756         0.4761         0.4766           2.0         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.481           2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4854         0.4851           2.2         0.4861         0.4864         0.4868         0.4871         0.4875         0.4878         0.4881         0.4884         0.4887         0.4896           2.3         0.4893         0.4896         0.4898         0.4901         0.4904         0.4906         0.4909         0.4911         0.4913         0.4914           2.4         0.4918         0.4920         0.4922         0.4925         0.4927         0.4929         0.4931         0.4932         0.4934         0.4932           2.5         0.4938         0.4940	1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.9         0.4713         0.4719         0.4726         0.4732         0.4738         0.4744         0.4750         0.4756         0.4761         0.4766           2.0         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.481           2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4854         0.485           2.2         0.4861         0.4864         0.4868         0.4871         0.4875         0.4878         0.4881         0.4884         0.4887         0.4896           2.3         0.4893         0.4896         0.4901         0.4904         0.4906         0.4909         0.4911         0.4913         0.4931           2.4         0.4918         0.4920         0.4922         0.4925         0.4927         0.4929         0.4931         0.4932         0.4934         0.4935           2.5         0.4938         0.4941         0.4943         0.4945         0.4946         0.4948         0.4949         0.4951         0.4952           2.6         0.4953         0.4955         0.4956         0.4957	1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
2.0         0.4772         0.4778         0.4783         0.4788         0.4793         0.4798         0.4803         0.4808         0.4812         0.481           2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4854         0.485           2.2         0.4861         0.4864         0.4868         0.4871         0.4875         0.4878         0.4881         0.4884         0.4887         0.4896           2.3         0.4893         0.4896         0.4898         0.4901         0.4904         0.4906         0.4909         0.4911         0.4913         0.4913           2.4         0.4918         0.4920         0.4922         0.4925         0.4927         0.4929         0.4931         0.4932         0.4934         0.4935           2.5         0.4938         0.4941         0.4943         0.4945         0.4946         0.4948         0.4949         0.4951         0.4952           2.6         0.4953         0.4955         0.4956         0.4957         0.4959         0.4960         0.4961         0.4962         0.4963         0.4970           2.7         0.4965         0.4966         0.4967	1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
2.1         0.4821         0.4826         0.4830         0.4834         0.4838         0.4842         0.4846         0.4850         0.4854         0.4852           2.2         0.4861         0.4864         0.4868         0.4871         0.4875         0.4878         0.4881         0.4884         0.4887         0.4899           2.3         0.4893         0.4896         0.4898         0.4901         0.4904         0.4906         0.4909         0.4911         0.4913         0.4913         0.4931           2.4         0.4918         0.4920         0.4922         0.4925         0.4927         0.4929         0.4931         0.4932         0.4934         0.4932           2.5         0.4938         0.4941         0.4943         0.4945         0.4946         0.4948         0.4949         0.4951         0.4952           2.6         0.4953         0.4955         0.4956         0.4957         0.4959         0.4960         0.4961         0.4962         0.4963         0.4964           2.7         0.4965         0.4966         0.4967         0.4968         0.4969         0.4970         0.4971         0.4972         0.4973         0.4973	1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.2       0.4861       0.4864       0.4868       0.4871       0.4875       0.4878       0.4881       0.4884       0.4887       0.4898         2.3       0.4893       0.4896       0.4898       0.4901       0.4904       0.4906       0.4909       0.4911       0.4913       0.4916         2.4       0.4918       0.4920       0.4922       0.4925       0.4927       0.4929       0.4931       0.4932       0.4934       0.4936         2.5       0.4938       0.4940       0.4941       0.4943       0.4945       0.4946       0.4948       0.4949       0.4951       0.4952         2.6       0.4953       0.4955       0.4956       0.4957       0.4959       0.4960       0.4961       0.4962       0.4963       0.4964         2.7       0.4965       0.4966       0.4967       0.4968       0.4969       0.4970       0.4971       0.4972       0.4973       0.4973	2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.3       0.4893       0.4896       0.4898       0.4901       0.4904       0.4906       0.4909       0.4911       0.4913       0.4916         2.4       0.4918       0.4920       0.4922       0.4925       0.4927       0.4929       0.4931       0.4932       0.4934       0.4933         2.5       0.4938       0.4940       0.4941       0.4943       0.4945       0.4946       0.4948       0.4949       0.4951       0.4955         2.6       0.4953       0.4955       0.4956       0.4957       0.4959       0.4960       0.4961       0.4962       0.4963       0.4964         2.7       0.4965       0.4966       0.4967       0.4968       0.4969       0.4970       0.4971       0.4972       0.4973       0.4974	2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.4       0.4918       0.4920       0.4922       0.4925       0.4927       0.4929       0.4931       0.4932       0.4934       0.4936         2.5       0.4938       0.4940       0.4941       0.4943       0.4945       0.4946       0.4948       0.4949       0.4951       0.4952         2.6       0.4953       0.4955       0.4956       0.4957       0.4959       0.4960       0.4961       0.4962       0.4963       0.4963         2.7       0.4965       0.4966       0.4967       0.4968       0.4969       0.4970       0.4971       0.4972       0.4973       0.4973	2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.5         0.4938         0.4940         0.4941         0.4943         0.4945         0.4946         0.4948         0.4949         0.4951         0.4955           2.6         0.4953         0.4955         0.4956         0.4957         0.4959         0.4960         0.4961         0.4962         0.4963         0.4966           2.7         0.4965         0.4966         0.4967         0.4968         0.4969         0.4970         0.4971         0.4972         0.4973         0.4974	2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.6         0.4953         0.4955         0.4956         0.4957         0.4959         0.4960         0.4961         0.4962         0.4963         0.4964           2.7         0.4965         0.4966         0.4967         0.4968         0.4969         0.4970         0.4971         0.4972         0.4973         0.4974	2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
<b>2.7</b> 0.4965 0.4966 0.4967 0.4968 0.4969 0.4970 0.4971 0.4972 0.4973 0.4974	2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
3.0	2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
28 0.4974 0.4975 0.4976 0.4977 0.4977 0.4979 0.4979 0.4979 0.4979	2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.0 0.4374 0.4373   0.4370   0.4377   0.4377   0.4378   0.4373   0.4373   0.4380   0.438	2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
<b>2.9</b> 0.4981 0.4982 0.4982 0.4983 0.4984 0.4984 0.4985 0.4985 0.4986 0.4986	2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
<b>3.0</b> 0.4987 0.4987 0.4987 0.4988 0.4988 0.4989 0.4989 0.4989 0.4990 0.4990	3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
<b>3.1</b> 0.4990 0.4991 0.4991 0.4991 0.4992 0.4992 0.4992 0.4992 0.4993 0.4993	3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
<b>3.2</b> 0.4993 0.4993 0.4994 0.4994 0.4994 0.4994 0.4994 0.4995 0.4995 0.4995	3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
<b>3.3</b> 0.4995 0.4995 0.4995 0.4996 0.4996 0.4996 0.4996 0.4996 0.4996 0.4996	3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
2.4	3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997			<del></del>	0.4998
25	3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	ļ	0.4998
2.5	3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999				0.4999
2.7	3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999			0.4999
3.0	3.8	0.4999	0.4999	0.4999	0.4999	0.4999				ļ	0.4999
2.0	3.9	0.5000	0.5000	0.5000	0.5000	0.5000					0.5000