# University of Mumbai
# Examination 2021 under cluster __ (Lead College: _________)
### Examinations Commencing from 1st June 2021 to 10th June 2021
Program: S.E.(Computer Engineering)
Curriculum Scheme: Rev-2019 ‘C’ Scheme
Examination: S.E. Semester IV
Course Code: CSC401 Course Name: Engineering Mathematics IV
Time: 2 hour Max. Marks: 80
==========================================================

<table>
<tr><th>Q1.</th><th>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</th></tr>
<tr><td></td><td></td></tr>
<tr><td>1.</td><td>The region of rejection of the null hypothesis $H_0$ is known as</td></tr>
<tr><td>Option A:</td><td>Critical region</td></tr>
<tr><td>Option B:</td><td>Favourable region</td></tr>
<tr><td>Option C:</td><td>Domain</td></tr>
<tr><td>Option D:</td><td>Confidence region</td></tr>
<tr><td></td><td></td></tr>
<tr><td>2.</td><td>Sample of two types of electric bulbs were tested for length of life and the following data were obtained
<table>
<tr><td></td><td>Size</td><td>Mean</td><td>SD</td></tr>
<tr><td>Sample 1</td><td>8</td><td>1234 h</td><td>36 h</td></tr>
<tr><td>Sample 2</td><td>7</td><td>1036 h</td><td>40 h</td></tr>
</table>
The absolute value of test statistic in testing the significance of difference between means is</td></tr>
<tr><td>Option A:</td><td>t=10.77</td></tr>
<tr><td>Option B:</td><td>t=9.39</td></tr>
<tr><td>Option C:</td><td>t=8.5</td></tr>
<tr><td>Option D:</td><td>t=6.95</td></tr>
<tr><td></td><td></td></tr>
<tr><td>3.</td><td>If X is a poisson variate such that $P(X = 1) = P(X = 2)$, then $P(X = 3)$ is</td></tr>
<tr><td>Option A:</td><td>$\frac{4e^2}{3}$</td></tr>
<tr><td>Option B:</td><td>$4e^2$</td></tr>
<tr><td>Option C:</td><td>$\frac{4}{3e^2}$</td></tr>
<tr><td>Option D:</td><td>$\frac{4}{e^2}$</td></tr>
<tr><td></td><td></td></tr>
</table>

| | |
|---|---|
| 4. | If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ , Then following is not the eigenvalue ofadj A. |
| Option A: | 6 |
| Option B: | 2 |
| Option C: | 4 |
| Option D: | 3 |
| | |
| 5. | For the matrix $\begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ the eigenvector corresponding to the distinct eigenvalue $\lambda = 2$ is |
| Option A: | $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ |
| Option B: | $\begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}$ |
| Option C: | $\begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$ |
| Option D: | $\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$ |
| | |
| 6. | The necessary and sufficient condition for a square matrix to be diagonalizable is that for each of it's eigenvalue |
| Option A: | algebraic multiplicity > geometric multiplicity |
| Option B: | algebraic multiplicity = geometric multiplicity |
| Option C: | algebraic multiplicity < geometric multiplicity |
| Option D: | algebraic multiplicity ≠ geometric multiplicity |
| | |
| 7. | If the characteristic equation of a matrix A of order $3 \times 3$ is $\lambda^3 - 7\lambda^2 + 11\lambda - 5 = 0$, then by the Cayley-Hamilton theorem $A^{-1}$ is equal to |
| Option A: | $\frac{1}{5}(A^3 - 7A^2 + 11\text{A})$ |
| Option B: | $\frac{1}{5}(A^2 + 7A + 11\text{I})$ |
| Option C: | $\frac{1}{5}(A^3 + 7A^2 + 11\text{A})$ |
| Option D: | $\frac{1}{5}(A^2 - 7A + 11\text{I})$ |
| | |
| 8. | Value of an integral $\int_0^{1+i}(x^2 - iy)dz$ along the path $y = x^2$ is |
| Option A: | $\frac{5}{6} - \frac{i}{6}$ |
| Option B: | $-\frac{5}{6} - \frac{i}{6}$ |
| Option C: | $\frac{5}{6} + \frac{i}{6}$ |
| Option D: | $\frac{-5}{6} + \frac{i}{6}$ |
| | |

| | |
|---|---|
| 9. | Integral $\int \frac{5z^2+7z+1}{z+1}\, dz$ along a circle $\lvert z\rvert = \frac{1}{2}$is equal to |
| Option A: | 1 |
| Option B: | -1 |
| Option C: | 3/2 |
| Option D: | 0 |
| | |
| 10. | Analytic function gets expanded as a Laurent series if the region of convergence is |
| Option A: | rectangular |
| Option B: | triangular |
| Option C: | circular |
| Option D: | annular |
| | |
| 11. | Residue of $f(z) = \frac{z^2}{(z+1)^2(z-2)}$ at a pole $z = 2$ is |
| Option A: | 4/9 |
| Option B: | 2/9 |
| Option C: | 1/2 |
| Option D: | 0 |
| | |
| 12. | z-transform of an unit impulse function $\delta(k) = \begin{matrix} 1\,, & at\ k = 0 \\ 0\,, & otherwise \end{matrix}$ is |
| Option A: | 1 |
| Option B: | 0 |
| Option C: | -1 |
| Option D: | k |
| | |
| 13. | $z\{\sin(3k+5)\},\ k \geq 0$ is |
| Option A: | $\frac{z^2 \sin 2 - z \sin 5}{z^2 - 2z\cos 3 + 1}$ |
| Option B: | $\frac{z^2 \sin 5 + z \sin 2}{z^2 - 2z\cos 3 + 1}$ |
| Option C: | $\frac{z^2 \sin 5 - z \sin 2}{z^2 - 2z\cos 3 + 1}$ |
| Option D: | $\frac{z^2 \sin 2 + z \sin 5}{z^2 - 2z\cos 3 + 1}$ |
| | |
| 14. | The inverse z-transform of $f(z) = \frac{z}{(z-1)(z-2)}$ $,\lvert z\rvert > 2$ is |
| Option A: | $2^k - 2$ |
| Option B: | $2^k - 1$ |
| Option C: | $2^k + 1$ |
| Option D: | $2^k + 2$ |
| | |
| 15. | If the basic solution of LPP is $x = 1, y = 0$ then the solution is |
| Option A: | Feasible and non-Degenerate |
| Option B: | Non-Feasible and Degenerate |
| Option C: | Feasible and Degenerate |
| Option D: | Non-Feasible and non-Degenerate |

| | |
|---|---|
| | |
| 16. | If the primal LPP has an unbounded solution then the dual has |
| Option A: | Unbounded solution |
| Option B: | Bounded solution |
| Option C: | Feasible solution |
| Option D: | Infeasible solution |
| | |
| 17. | Dual of the following LPP is<br>Maximize $z = 2x_1 + 9x_2 + 11x_3$<br>$x_1 - x_2 + x_3 \geq 3$<br>Subject to $-3x_1 + 2x_3 \leq 1$<br>$2x_1 + x_2 - 5x_3 = 1$<br>$x_1, x_2, x_3 \geq 0$ |
| Option A: | Minimize $w = -3y_1 + y_2 + y'$<br>$-y_1 - 3y_2 + 2y' \geq 2$<br>Subject to $y_1 + y' \geq 9$<br>$-y_1 + 2y_2 - 5y' \geq 11$<br>$y_1, y_2 \geq 0$, y' unrestricted |
| Option B: | Minimize $w = -3y_1 + y_2 + y_3$<br>$-y_1 - 3y_2 + 2y_3 \geq 2$<br>Subject to $y_1 + y_3 \geq 9$<br>$-y_1 + 2y_2 - 5y_3 \geq 11$<br>$y_1, y_2, y_3 \geq 0$ |
| Option C: | Minimize $w = 2y_1 + 9y_2 + 11y'$<br>$-y_1 - 3y_2 + 2y' \geq 3$<br>Subject to $y_1 + y' \geq 1$<br>$-y_1 + 2y_2 - 5y' \geq 1$<br>$y_1, y_2 \geq 0$, y' unrestricted |
| Option D: | Minimize $w = 2y_1 + 9y_2 + 11y_3$<br>$-y_1 - 3y_2 + 2y_3 \geq 3$<br>Subject to $y_1 + y_3 \geq 1$<br>$-y_1 + 2y_2 - 5y_3 \geq 1$<br>$y_1, y_2 \geq 0$, y' unrestricted |
| | |
| 18. | Consider the NLPP:<br>Maximize $z = f(x_1, x_2)$, subject to the constraint $h = g(x_1, x_2) - b \leq 0$.<br>Let $L = f - \lambda g$, then the Kuhn-Tucker conditions are |
| Option A: | $\frac{\partial L}{\partial x_1} \geq 0, \quad \frac{\partial L}{\partial x_2} \geq 0, \quad \lambda h \geq 0, \quad h \geq 0, \quad \lambda \geq 0$ |
| Option B: | $\frac{\partial L}{\partial x_1} = 0, \quad \frac{\partial L}{\partial x_2} = 0, \quad \lambda h = 0, \quad h \leq 0, \quad \lambda \geq 0$ |
| Option C: | $\frac{\partial L}{\partial x_1} = 0, \quad \frac{\partial L}{\partial x_2} = 0, \quad \lambda h \geq 0, \quad h \leq 0, \quad \lambda \leq 0$ |
| Option D: | $\frac{\partial L}{\partial x_1} \geq 0, \quad \frac{\partial L}{\partial x_2} \geq 0, \quad \lambda h \geq 0, \quad h \geq 0, \quad \lambda = 0$ |
| | |
| 19. | In a non-linear programming problem, |
| Option A: | All the constraints should be linear |
| Option B: | All the constraints should be non-linear |

| | |
|---|---|
| Option C: | Either the objective function or atleast one of the constraints should be non-linear |
| Option D: | The objective function and all constraints should be linear. |
| | |
| 20. | Pick the non-linear constraint |
| Option A: | $xy + y \geq 7$ |
| Option B: | $2x - y \leq 5$ |
| Option C: | $x + y \leq 6$ |
| Option D: | $x + 2y = 9$ |

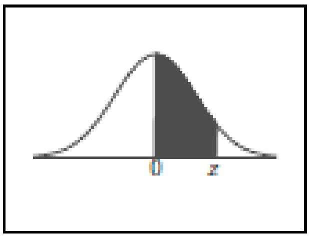
## Subjective/descriptive questions

| **Q2**<br>**(20 Marks )** | **Solve any Four out of Six5 marks each** |
|---|---|
| A | In an exam taken by 800 candidates, the average and standard deviation of marks obtained (normally distributed) are 40% and 10% respectively. What should be the minimum score if 350 candidates are to be declared as passed |
| B | If A= $\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ , By using Cayley-Hamilton theorem find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 + 2A + I$ |
| C | Evaluate the following integral using Cauchy-Residue theorem.<br>$I = \int_C \frac{z^2+3z}{\left(z+\frac{1}{4}\right)^2 (z-2)} dz$ where c is the circle $\left\|z - \frac{1}{2}\right\| = 1$ |
| D | Obtain inverse z-transform $\frac{z+2}{z^2-2z-3}$ , $1 < \|z\| < 3$ |
| E | Solve by the Simplex method<br>Maximize $z = 10x_1 + x_2 + x_3$<br>Subject to $x_1 + x_2 - 3x_3 \leq 10$<br>$4x_1 + x_2 + x_3 \leq 20$<br>$x_1, x_2, x_3 \geq 0$ |
| F | Using Lagrange's multipliers solve the following NLPP<br>Optimise $z = 4x_1 + 8x_2 - x_1^2 - x_2^2$<br>Subject to $x_1 + x_2 = 2$<br>$x_1, x_2 \geq 0$ |

<table>
<tr><td><b>Q3</b><br><b>(20 Marks )</b></td><td><b>Solve any Four out of Six5 marks each</b></td></tr>
<tr><td>A</td><td>When the first proof of 392 pages of a book of 1200 pages were read, the distribution of printing mistakes were found to be as follows.
<table>
<tr><td>No of mistakes in page (X)</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>No. of pages (f)</td><td>275</td><td>72</td><td>30</td><td>7</td><td>5</td></tr>
</table>
Fit a poisson distribution to the above data and test the goodness of fit.</td></tr>
</table>

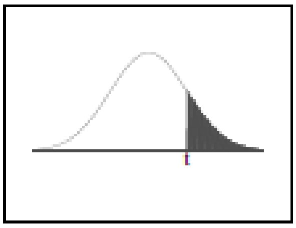
| | |
|---|---|
| B | Show that the matrix $\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -5 & -2 \end{bmatrix}$ is not diagonalizable. |
| C | If $f(z) = \frac{z-1}{(z-3)(z+1)}$ obtain Taylor's and Laurent's series expansions of f(z) in the domain $\lvert z\rvert < 1\&1 < \lvert z\rvert < 3$ respectively. |
| D | If $f(k) = \frac{1}{2^k} * \frac{1}{3^k}$ find $z\{f(k)\},\ k \geq 0$ |
| E | Solve using dual simplex method<br>Minimize $z = 2x_1 + 2x_2 + 4x_3$<br>Subject to $2x_1 + 3x_2 + 5x_3 \geq 2$<br>$3x_1 + x_2 + 7x_3 \leq 3$<br>$x_1 + 4x_2 + 6x_3 \leq 5$<br>$x_1, x_2, x_3 \geq 0$ |
| F | Solve following NLPP using Kuhn-Tucker method<br>Maximize $z = 2x_1^2 - 7x_2^2 - 16x_1 + 2x_2 + 12x_1x_2 + 7$<br>Subject to $2x_1 + 5x_2 \leq 105$<br>$x_1, x_2 \geq 0$ |

# Standard Normal Distribution Table



| z | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0160 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0753 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .2019 | .2054 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2257 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2517 | .2549 |
| 0.7 | .2580 | .2611 | .2642 | .2673 | .2704 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2995 | .3023 | .3051 | .3078 | .3106 | .3133 |
| 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4987 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |
| 3.1 | .4990 | .4991 | .4991 | .4991 | .4992 | .4992 | .4992 | .4992 | .4993 | .4993 |
| 3.2 | .4993 | .4993 | .4994 | .4994 | .4994 | .4994 | .4994 | .4995 | .4995 | .4995 |
| 3.3 | .4995 | .4995 | .4995 | .4996 | .4996 | .4996 | .4996 | .4996 | .4996 | .4997 |
| 3.4 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4998 |
| 3.5 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 |

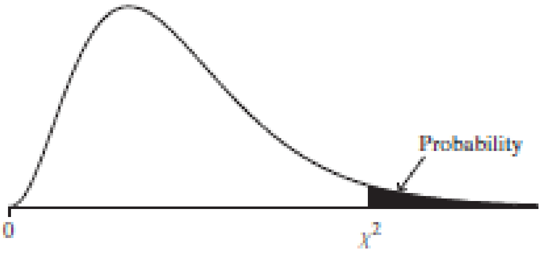
# t-Distribution Table



The shaded area is equal to $\alpha$ for $t = t_{\alpha}$.

| *df* | $t_{.100}$ | $t_{.050}$ | $t_{.025}$ | $t_{.010}$ | $t_{.005}$ |
|---|---|---|---|---|---|
| 1 | 3.078 | 6.314 | 12.706 | 31.821 | 63.657 |
| 2 | 1.886 | 2.920 | 4.303 | 6.965 | 9.925 |
| 3 | 1.638 | 2.353 | 3.182 | 4.541 | 5.841 |
| 4 | 1.533 | 2.132 | 2.776 | 3.747 | 4.604 |
| 5 | 1.476 | 2.015 | 2.571 | 3.365 | 4.032 |
| 6 | 1.440 | 1.943 | 2.447 | 3.143 | 3.707 |
| 7 | 1.415 | 1.895 | 2.365 | 2.998 | 3.499 |
| 8 | 1.397 | 1.860 | 2.306 | 2.896 | 3.355 |
| 9 | 1.383 | 1.833 | 2.262 | 2.821 | 3.250 |
| 10 | 1.372 | 1.812 | 2.228 | 2.764 | 3.169 |
| 11 | 1.363 | 1.796 | 2.201 | 2.718 | 3.106 |
| 12 | 1.356 | 1.782 | 2.179 | 2.681 | 3.055 |
| 13 | 1.350 | 1.771 | 2.160 | 2.650 | 3.012 |
| 14 | 1.345 | 1.761 | 2.145 | 2.624 | 2.977 |
| 15 | 1.341 | 1.753 | 2.131 | 2.602 | 2.947 |
| 16 | 1.337 | 1.746 | 2.120 | 2.583 | 2.921 |
| 17 | 1.333 | 1.740 | 2.110 | 2.567 | 2.898 |
| 18 | 1.330 | 1.734 | 2.101 | 2.552 | 2.878 |
| 19 | 1.328 | 1.729 | 2.093 | 2.539 | 2.861 |
| 20 | 1.325 | 1.725 | 2.086 | 2.528 | 2.845 |
| 21 | 1.323 | 1.721 | 2.080 | 2.518 | 2.831 |
| 22 | 1.321 | 1.717 | 2.074 | 2.508 | 2.819 |
| 23 | 1.319 | 1.714 | 2.069 | 2.500 | 2.807 |
| 24 | 1.318 | 1.711 | 2.064 | 2.492 | 2.797 |
| 25 | 1.316 | 1.708 | 2.060 | 2.485 | 2.787 |
| 26 | 1.315 | 1.706 | 2.056 | 2.479 | 2.779 |
| 27 | 1.314 | 1.703 | 2.052 | 2.473 | 2.771 |
| 28 | 1.313 | 1.701 | 2.048 | 2.467 | 2.763 |
| 29 | 1.311 | 1.699 | 2.045 | 2.462 | 2.756 |
| 30 | 1.310 | 1.697 | 2.042 | 2.457 | 2.750 |
| 32 | 1.309 | 1.694 | 2.037 | 2.449 | 2.738 |
| 34 | 1.307 | 1.691 | 2.032 | 2.441 | 2.728 |
| 36 | 1.306 | 1.688 | 2.028 | 2.434 | 2.719 |
| 38 | 1.304 | 1.686 | 2.024 | 2.429 | 2.712 |
| $\infty$ | 1.282 | 1.645 | 1.960 | 2.326 | 2.576 |

**TABLE C:** Chi-Squared Distribution Values for Various Right-Tail Probabilities



| | Right-Tail Probability | | | | | | |
|---|---|---|---|---|---|---|---|
| *df* | 0.250 | 0.100 | 0.050 | 0.025 | 0.010 | 0.005 | 0.001 |
| 1 | 1.32 | 2.71 | 3.84 | 5.02 | 6.63 | 7.88 | 10.83 |
| 2 | 2.77 | 4.61 | 5.99 | 7.38 | 9.21 | 10.60 | 13.82 |
| 3 | 4.11 | 6.25 | 7.81 | 9.35 | 11.34 | 12.84 | 16.27 |
| 4 | 5.39 | 7.78 | 9.49 | 11.14 | 13.28 | 14.86 | 18.47 |
| 5 | 6.63 | 9.24 | 11.07 | 12.83 | 15.09 | 16.75 | 20.52 |
| 6 | 7.84 | 10.64 | 12.59 | 14.45 | 16.81 | 18.55 | 22.46 |
| 7 | 9.04 | 12.02 | 14.07 | 16.01 | 18.48 | 20.28 | 24.32 |
| 8 | 10.22 | 13.36 | 15.51 | 17.53 | 20.09 | 21.96 | 26.12 |
| 9 | 11.39 | 14.68 | 16.92 | 19.02 | 21.67 | 23.59 | 27.88 |
| 10 | 12.55 | 15.99 | 18.31 | 20.48 | 23.21 | 25.19 | 29.59 |
| 11 | 13.70 | 17.28 | 19.68 | 21.92 | 24.72 | 26.76 | 31.26 |
| 12 | 14.85 | 18.55 | 21.03 | 23.34 | 26.22 | 28.30 | 32.91 |
| 13 | 15.98 | 19.81 | 22.36 | 24.74 | 27.69 | 29.82 | 34.53 |
| 14 | 17.12 | 21.06 | 23.68 | 26.12 | 29.14 | 31.32 | 36.12 |
| 15 | 18.25 | 22.31 | 25.00 | 27.49 | 30.58 | 32.80 | 37.70 |
| 16 | 19.37 | 23.54 | 26.30 | 28.85 | 32.00 | 34.27 | 39.25 |
| 17 | 20.49 | 24.77 | 27.59 | 30.19 | 33.41 | 35.72 | 40.79 |
| 18 | 21.60 | 25.99 | 28.87 | 31.53 | 34.81 | 37.16 | 42.31 |
| 19 | 22.72 | 27.20 | 30.14 | 32.85 | 36.19 | 38.58 | 43.82 |
| 20 | 23.83 | 28.41 | 31.41 | 34.17 | 37.57 | 40.00 | 45.32 |
| 25 | 29.34 | 34.38 | 37.65 | 40.65 | 44.31 | 46.93 | 52.62 |
| 30 | 34.80 | 40.26 | 43.77 | 46.98 | 50.89 | 53.67 | 59.70 |
| 40 | 45.62 | 51.80 | 55.76 | 59.34 | 63.69 | 66.77 | 73.40 |
| 50 | 56.33 | 63.17 | 67.50 | 71.42 | 76.15 | 79.49 | 86.66 |
| 60 | 66.98 | 74.40 | 79.08 | 83.30 | 88.38 | 91.95 | 99.61 |
| 70 | 77.58 | 85.53 | 90.53 | 95.02 | 100.4 | 104.2 | 112.3 |
| 80 | 88.13 | 96.58 | 101.8 | 106.6 | 112.3 | 116.3 | 124.8 |
| 90 | 98.65 | 107.6 | 113.1 | 118.1 | 124.1 | 128.3 | 137.2 |
| 100 | 109.1 | 118.5 | 124.3 | 129.6 | 135.8 | 140.2 | 149.5 |