

# QUESTION BOOKLET – 2016

Subject : Paper III : Mathematics



Question Booklet Version

**22**

(Write this number on  
your Answer Sheet)

Roll No.

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|

Answer Sheet No.

|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|

Question Booklet Sr. No.

(Write this number on  
your Answer Sheet)

Duration: 1 Hour 30 Minutes

Total Marks : 100

This is to certify that, the entries of Roll Number and Answer Sheet Number have been correctly written and verified.

*Candidate's Signature*

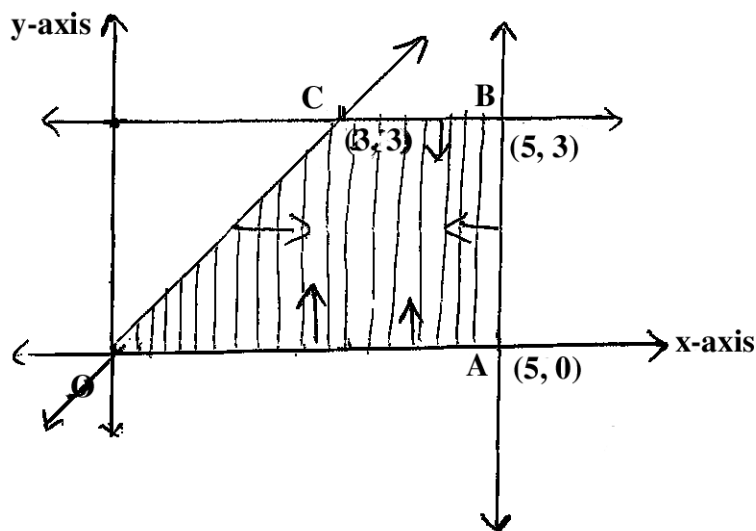
*Invigilator's Signature*

## Instructions to Candidates

1. This question booklet contains 50 Objective Type Questions (Single Best Response Type) in the subject of Mathematics.
2. The question paper and OMR (Optical Mark Reader) Answer Sheet is issued to examinees separately at the beginning of the examination session.
3. Choice and sequence for attempting questions will be as per the convenience of the candidate.
4. Candidate should carefully read the instructions printed on the Question Booklet and Answer Sheet and make the correct entries on the Answer Sheet. As Answer Sheets are designed to suit the OPTICAL MARK READER (OMR) SYSTEM, special care should be taken to mark appropriate entries/answers correctly. Special care should be taken to fill QUESTION BOOKLET VERSION, SERIAL No. and Roll No. accurately. The correctness of entries has to be cross-checked by the invigilators. **The candidate must sign on the Answer Sheet and Question Booklet.**
5. Read each question carefully.
6. Determine the correct answer from out of the four available options given for each question.
7. Fill the appropriate circle completely like this ●, for answering the particular question, with Black ink ball point pen only, in the OMR Answer Sheet.
8. Each answer with correct response shall be awarded **two (2) marks**. There is **no Negative Marking**. If the examinee has marked two or more answers or has done scratching and overwriting in the Answer Sheet in response to any question, or has marked the circles inappropriately e.g. half circle, dot, tick mark, cross etc, mark/s shall NOT be awarded for such answer/s, as these may not be read by the scanner. Answer sheet of each candidate will be evaluated by computerized scanning method only (Optical Mark Reader) and there will not be any manual checking during evaluation or verification.
9. Use of whitener or any other material to erase/hide the circle once filled is not permitted. Avoid overwriting and/or striking of answers once marked.
10. Rough work should be done only on the blank space provided in the Question Booklet. **Rough work should not be done on the Answer Sheet.**
11. The required mathematical tables (Log etc.) are provided within the question booklet.
12. Immediately after the prescribed examination time is over, the Question Booklet and Answer Sheet are to be returned to the Invigilator. Confirm that both the Candidate and Invigilator have signed on question booklet and answer sheet.
13. No candidate is allowed to leave the examination hall till the examination session is over.

**MATHEMATICS**

1. If  $G(\bar{g})$ ,  $H(\bar{h})$  and  $P(\bar{p})$  are centroid, orthocenter and circumcenter of a triangle and  $x\bar{p} + y\bar{h} + z\bar{g} = 0$  then  $(x, y, z) =$  \_\_\_\_\_  
A) 1, 1, -2                      B) 2, 1, -3                      C) 1, 3, -4                      D) 2, 3, -5
2. Which of the following quantified statement is true ?  
A) The square of every real number is positive  
B) There exists a real number whose square is negative  
C) There exists a real number whose square is not positive  
D) Every real number is rational
3. The general solution of the equation  $\tan^2 x = 1$  is  
A)  $n\pi + \frac{\pi}{4}$                       B)  $n\pi - \frac{\pi}{4}$                       C)  $n\pi \pm \frac{\pi}{4}$                       D)  $2n\pi \pm \frac{\pi}{4}$
4. The shaded part of given figure indicates the feasible region



then the constraints are

- A)  $x, y \geq 0, x + y \geq 0, x \geq 5, y \leq 3$                       B)  $x, y \geq 0, x - y \geq 0, x \leq 5, y \leq 3$   
C)  $x, y \geq 0, x - y \geq 0, x \leq 5, y \geq 3$                       D)  $x, y \geq 0, x - y \leq 0, x \leq 5, y \leq 3$

SPACE FOR ROUGH WORK



5. Direction ratios of the line which is perpendicular to the lines with direction ratios  $-1, 2, 2$  and  $0, 2, 1$  are

A)  $1, 1, 2$                       B)  $2, -1, 2$                       C)  $-2, 1, 2$                       D)  $2, 1, -2$

6. If r.v.  $X$  : waiting time in minutes for bus and p.d.f. of  $X$  is given by

$$f(x) = \begin{cases} \frac{1}{5}, & 0 \leq x \leq 5 \\ 0, & \text{otherwise,} \end{cases}$$

then probability of waiting time not more than 4 minutes is = \_\_\_\_\_

A) 0.3                      B) 0.8                      C) 0.2                      D) 0.5

7. In  $\Delta ABC$   $(a-b)^2 \cos^2 \frac{C}{2} + (a+b)^2 \sin^2 \frac{C}{2} =$

A)  $b^2$                       B)  $c^2$                       C)  $a^2$                       D)  $a^2 + b^2 + c^2$

8. Derivative of  $\log (\sec \theta + \tan \theta)$  with respect to  $\sec \theta$  at  $\theta = \frac{\pi}{4}$  is \_\_\_\_\_

A) 0                      B) 1                      C)  $\frac{1}{\sqrt{2}}$                       D)  $\sqrt{2}$

9. The joint equation of bisectors of angles between lines  $x = 5$  and  $y = 3$  is \_\_\_\_\_

A)  $(x-5)(y-3) = 0$                       B)  $x^2 - y^2 - 10x + 6y + 16 = 0$   
C)  $xy = 0$                       D)  $xy - 5x - 3y + 15 = 0$

10. The point on the curve  $6y = x^3 + 2$  at which  $y$  - co-ordinate is changing 8 times as fast as  $x$  - co-ordinate is \_\_\_\_\_

A)  $(4, 11)$                       B)  $(4, -11)$                       C)  $(-4, 11)$                       D)  $(-4, -11)$

---

SPACE FOR ROUGH WORK



11. If Matrix  $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$  such that  $Ax = I$ , then  $x =$  \_\_\_\_\_

- A)  $\frac{1}{5} \begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$       B)  $\frac{1}{5} \begin{bmatrix} 4 & 2 \\ 4 & -1 \end{bmatrix}$       C)  $\frac{1}{5} \begin{bmatrix} -3 & 2 \\ 4 & -1 \end{bmatrix}$       D)  $\frac{1}{5} \begin{bmatrix} -1 & 2 \\ -1 & 4 \end{bmatrix}$

12. If  $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ ,  $\vec{b} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ ,  $\vec{c} = \hat{i} - \hat{j} + 4\hat{k}$  and  $\vec{a} \cdot (\vec{b} \times \vec{c}) = 10$ , then  $\lambda$  is equal to

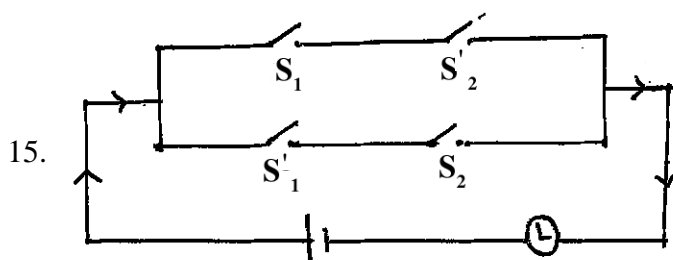
- A) 6      B) 7      C) 9      D) 10

13. If r.v.  $X \sim B\left(n=5, P=\frac{1}{3}\right)$  then  $P(2 < X < 4) =$  \_\_\_\_\_

- A)  $\frac{80}{243}$       B)  $\frac{40}{243}$       C)  $\frac{40}{343}$       D)  $\frac{80}{343}$

14. The objective function  $z = x_1 + x_2$ , subject to  $x_1 + x_2 \leq 10$ ,  $-2x_1 + 3x_2 \leq 15$ ,  $x_1 \leq 6$ ,  $x_1, x_2 \geq 0$  has maximum value \_\_\_\_\_ of the feasible region.

- A) at only one point  
B) at only two points  
C) at every point of the segment joining two points  
D) at every point of the line joining two points



Symbolic form of the given switching circuit is equivalent to \_\_\_\_\_

- A)  $p \vee \sim q$       B)  $p \wedge \sim q$       C)  $p \leftrightarrow q$       D)  $\sim (p \leftrightarrow q)$

---

SPACE FOR ROUGH WORK



16. If  $\log_{10} \left( \frac{x^2 - y^2}{x^2 + y^2} \right) = 2$ , then  $\frac{dy}{dx} =$  \_\_\_\_\_

A)  $-\frac{99x}{101y}$

B)  $\frac{99x}{101y}$

C)  $-\frac{99y}{101x}$

D)  $\frac{99y}{101x}$

17.  $\int_{-\pi/2}^{\pi/2} \log \left( \frac{2 - \sin x}{2 + \sin x} \right) dx =$

A) 1

B) 3

C) 2

D) 0

18.  $\int \left( \frac{(x^2 + 2) a^{(x + \tan^{-1} x)}}{x^2 + 1} \right) dx =$  \_\_\_\_\_

A)  $\log a \cdot a^{x + \tan^{-1} x} + c$

B)  $\frac{(x + \tan^{-1} x)}{\log a} + c$

C)  $\frac{a^{x + \tan^{-1} x}}{\log a} + c$

D)  $\log a \cdot (x + \tan^{-1} x) + c$

19. The degree and order of the differential equation  $\left[ 1 + \left( \frac{dy}{dx} \right)^3 \right]^{7/3} = 7 \left( \frac{d^2y}{dx^2} \right)$  respectively are

A) 3 and 7

B) 3 and 2

C) 7 and 3

D) 2 and 3

---

SPACE FOR ROUGH WORK



20. The acute angle between the line  $\vec{r} = (\hat{i} + 2\hat{j} + \hat{k}) + \lambda(\hat{i} + \hat{j} + \hat{k})$  and the plane  $\vec{r} \cdot (2\hat{i} - \hat{j} + \hat{k}) = 5$

A)  $\cos^{-1}\left(\frac{\sqrt{2}}{3}\right)$     B)  $\sin^{-1}\left(\frac{\sqrt{2}}{3}\right)$     C)  $\tan^{-1}\left(\frac{\sqrt{2}}{3}\right)$     D)  $\sin^{-1}\left(\frac{\sqrt{2}}{\sqrt{3}}\right)$

21. If the p.d.f. of a r.v.  $X$  is given as

|              |     |     |      |      |     |
|--------------|-----|-----|------|------|-----|
| $x_i$        | -2  | -1  | 0    | 1    | 2   |
| $P(X = x_i)$ | 0.2 | 0.3 | 0.15 | 0.25 | 0.1 |

then  $F(0) =$

- A)  $P(X < 0)$     B)  $P(X > 0)$     C)  $1 - P(X > 0)$     D)  $1 - P(X < 0)$

22. The particular solution of the differential equation  $y(1 + \log x) \frac{dx}{dy} - x \log x = 0$  when

$x = e, y = e^2$  is

- A)  $y = ex \log x$     B)  $ey = x \log x$     C)  $xy = e \log x$     D)  $y \log x = ex$

23.  $M$  and  $N$  are the midpoints of the diagonals  $AC$  and  $BD$  respectively of quadrilateral  $ABCD$ , then  $\overline{AB} + \overline{AD} + \overline{CB} + \overline{CD} =$  \_\_\_\_\_

- A)  $2 \overline{MN}$     B)  $2 \overline{NM}$     C)  $4 \overline{MN}$     D)  $4 \overline{NM}$

24. If  $\sin x$  is the integrating factor (I.F.) of the linear differential equation  $\frac{dy}{dx} + Py = Q$ , then  $P$  is

- A)  $\log \sin x$     B)  $\cos x$     C)  $\tan x$     D)  $\cot x$

25. Which of the following equation does not represent a pair of lines ?

- A)  $x^2 - x = 0$     B)  $xy - x = 0$     C)  $y^2 - x + 1 = 0$     D)  $xy + x + y + 1 = 0$

---

SPACE FOR ROUGH WORK



26. If the function  $f(x)$  defined by

$$f(x) = x \sin \frac{1}{x} \quad \text{for } x \neq 0$$

$$= k \quad \text{for } x = 0$$

is continuous at  $x = 0$ , then  $k =$  \_\_\_\_\_

A) 0

B) 1

C) -1

D)  $\frac{1}{2}$

27. If  $y = e^{m \sin^{-1} x}$  and  $(1 - x^2) \left( \frac{dy}{dx} \right)^2 = Ay^2$ , then  $A =$  \_\_\_\_\_

A)  $m$

B)  $-m$

C)  $m^2$

D)  $-m^2$

28.  $\int \left( \frac{4e^x - 25}{2e^x - 5} \right) dx = Ax + B \log |2e^x - 5| + c$  then

A)  $A = 5, B = 3$

B)  $A = 5, B = -3$

C)  $A = -5, B = 3$

D)  $A = -5, B = -3$

29.  $\frac{\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)}{\operatorname{cosec}^{-1}(-\sqrt{2}) + \cos^{-1}\left(-\frac{1}{2}\right)} =$

A)  $\frac{4}{5}$

B)  $-\frac{4}{5}$

C)  $\frac{3}{5}$

D) 0

---

SPACE FOR ROUGH WORK



30. For what value of  $k$ , the function defined by  $f(x) = \frac{\log(1+2x) \sin x^0}{x^2}$  for  $x \neq 0$   
 $= k$  for  $x = 0$

is continuous at  $x = 0$  ?

- A) 2                      B)  $\frac{1}{2}$                       C)  $\frac{\pi}{90}$                       D)  $\frac{90}{\pi}$

31. Probability of guessing correctly atleast 7 out of 10 answers in a "True" or "False" test is =

\_\_\_\_\_

- A)  $\frac{11}{64}$                       B)  $\frac{11}{32}$                       C)  $\frac{11}{16}$                       D)  $\frac{27}{32}$

32. Principal solutions of the equation  $\sin 2x + \cos 2x = 0$ , where  $\pi < x < 2\pi$  are

- A)  $7\frac{\pi}{8}, 11\frac{\pi}{8}$                       B)  $9\frac{\pi}{8}, 13\frac{\pi}{8}$                       C)  $11\frac{\pi}{8}, 15\frac{\pi}{8}$                       D)  $15\frac{\pi}{8}, 19\frac{\pi}{8}$

33. If line joining points A and B having position vectors  $6\bar{a} - 4\bar{b} + 4\bar{c}$  and  $-4\bar{c}$  respectively, and the line joining the points C and D having position vectors  $-\bar{a} - 2\bar{b} - 3\bar{c}$  and  $\bar{a} + 2\bar{b} - 5\bar{c}$  intersect, then their point of intersection is

- A) B                      B) C                      C) D                      D) A

34. If  $A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$  then  $(B^{-1}A^{-1})^{-1} =$  \_\_\_\_\_

- A)  $\begin{bmatrix} 2 & -2 \\ 2 & 3 \end{bmatrix}$                       B)  $\begin{bmatrix} 2 & 2 \\ -2 & 3 \end{bmatrix}$                       C)  $\begin{bmatrix} 2 & -3 \\ 2 & 2 \end{bmatrix}$                       D)  $\begin{bmatrix} 1 & -1 \\ -2 & 3 \end{bmatrix}$

---

SPACE FOR ROUGH WORK





35. If  $p$  : Every square is a rectangle

$q$  : Every rhombus is a kite then truth values of  $p \rightarrow q$  and  $p \leftrightarrow q$  are \_\_\_\_\_ and \_\_\_\_\_ respectively.

A) F, F

B) T, F

C) F, T

D) T, T

36. Let  $X \sim B(n, p)$ , if

$E(X) = 5$ ,  $\text{Var}(X) = 2.5$  then  $P(X < 1) =$  \_\_\_\_\_

A)  $\left(\frac{1}{2}\right)^{11}$

B)  $\left(\frac{1}{2}\right)^{10}$

C)  $\left(\frac{1}{2}\right)^6$

D)  $\left(\frac{1}{2}\right)^9$

37. Derivative of  $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right)$  with respect to  $\sin^{-1}(3x-4x^3)$  is \_\_\_\_\_

A)  $\frac{1}{\sqrt{1-x^2}}$

B)  $\frac{3}{\sqrt{1-x^2}}$

C) 3

D)  $\frac{1}{3}$

38. The differential equation of the family of circles touching y-axis at the origin is

A)  $(x^2 + y^2) \frac{dy}{dx} - 2xy = 0$

B)  $x^2 - y^2 + 2xy \frac{dy}{dx} = 0$

C)  $(x^2 - y^2) \frac{dy}{dx} - 2xy = 0$

D)  $(x^2 + y^2) \frac{dy}{dx} + 2xy = 0$

39. If  $A = \begin{bmatrix} 1 & 1 & 0 \\ 2 & 1 & 5 \\ 1 & 2 & 1 \end{bmatrix}$ , then  $a_{11}A_{21} + a_{12}A_{22} + a_{13}A_{23} =$  \_\_\_\_\_

A) 1

B) 0

C) -1

D) 2

---

SPACE FOR ROUGH WORK



40. If Rolle's theorem for  $f(x) = e^x (\sin x - \cos x)$  is verified on  $\left[\frac{\pi}{4}, 5\frac{\pi}{4}\right]$  then the value of  $c$  is
- A)  $\frac{\pi}{3}$                       B)  $\frac{\pi}{2}$                       C)  $3\frac{\pi}{4}$                       D)  $\pi$
41. The area of the region bounded by the curve  $y = 2x - x^2$  and  $x$ -axis is
- A)  $\frac{2}{3}$  sq.units              B)  $\frac{4}{3}$  sq.units              C)  $\frac{5}{3}$  sq.units              D)  $\frac{8}{3}$  sq.units
42. If  $\int \frac{f(x)}{\log(\sin x)} dx = \log[\log \sin x] + c$ , then  $f(x) =$
- A)  $\cot x$                       B)  $\tan x$                       C)  $\sec x$                       D)  $\operatorname{cosec} x$
43. If  $A$  and  $B$  are foot of perpendicular drawn from point  $Q(a, b, c)$  to the planes  $yz$  and  $zx$ , then equation of plane through the points  $A, B$  and  $O$  is \_\_\_\_\_
- A)  $\frac{x}{a} + \frac{y}{b} - \frac{z}{c} = 0$                       B)  $\frac{x}{a} - \frac{y}{b} + \frac{z}{c} = 0$
- C)  $\frac{x}{a} - \frac{y}{b} - \frac{z}{c} = 0$                       D)  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 0$
44. If  $\bar{a} = \hat{i} + \hat{j} - 2\hat{k}$ ,  $\bar{b} = 2\hat{i} - \hat{j} + \hat{k}$  and  $\bar{c} = 3\hat{i} - \hat{k}$  and  $\bar{c} = m\bar{a} + n\bar{b}$  then  $m + n =$  \_\_\_\_\_
- A) 0                              B) 1                              C) 2                              D) -1
45.  $\int_0^{\pi/2} \left( \frac{\sqrt[n]{\sec x}}{\sqrt[n]{\sec x} + \sqrt[n]{\operatorname{cosec} x}} \right) dx =$
- A)  $\frac{\pi}{2}$                               B)  $\frac{\pi}{3}$                               C)  $\frac{\pi}{4}$                               D)  $\frac{\pi}{6}$

---

SPACE FOR ROUGH WORK



46. The joint equation of lines passing through the origin and trisecting the first quadrant is \_\_\_\_\_

- A)  $x^2 + \sqrt{3}xy - y^2 = 0$                       B)  $x^2 - \sqrt{3}xy - y^2 = 0$   
C)  $\sqrt{3}x^2 - 4xy + \sqrt{3}y^2 = 0$                       D)  $3x^2 - y^2 = 0$

47. If  $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \operatorname{cosec} x)$  then  $\sin x + \cos x =$

- A)  $2\sqrt{2}$                       B)  $\sqrt{2}$                       C)  $\frac{1}{\sqrt{2}}$                       D)  $\frac{1}{2}$

48. Direction cosines of the line  $\frac{x+2}{2} = \frac{2y-5}{3}, z = -1$  are \_\_\_\_\_

- A)  $\frac{4}{5}, \frac{3}{5}, 0$                       B)  $\frac{3}{5}, \frac{4}{5}, \frac{1}{5}$                       C)  $-\frac{3}{5}, \frac{4}{5}, 0$                       D)  $\frac{4}{5}, -\frac{2}{5}, \frac{1}{5}$

49.  $\int \frac{1}{\sqrt{8+2x-x^2}} dx =$

- A)  $\frac{1}{3} \sin^{-1}\left(\frac{x-1}{3}\right) + c$                       B)  $\sin^{-1}\left(\frac{x+1}{3}\right) + c$   
C)  $\frac{1}{3} \sin^{-1}\left(\frac{x+1}{3}\right) + c$                       D)  $\sin^{-1}\left(\frac{x-1}{3}\right) + c$

50. The approximate value of  $f(x) = x^3 + 5x^2 - 7x + 9$  at  $x = 1.1$  is

- A) 8.6                      B) 8.5                      C) 8.4                      D) 8.3

---

SPACE FOR ROUGH WORK



### LOGARITHMS

|    | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|----|------|------|------|------|------|------|------|------|------|------|---|---|----|----|----|----|----|----|----|
| 10 | 0000 | 0043 | 0086 | 0128 | 0170 | 0212 | 0253 | 0294 | 0334 | 0374 | 5 | 9 | 13 | 17 | 21 | 26 | 30 | 34 | 38 |
|    |      |      |      |      |      |      |      |      |      |      | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 11 | 0414 | 0453 | 0492 | 0531 | 0569 | 0607 | 0645 | 0682 | 0719 | 0755 | 4 | 8 | 12 | 16 | 20 | 23 | 27 | 31 | 35 |
|    |      |      |      |      |      |      |      |      |      |      | 4 | 7 | 11 | 15 | 18 | 22 | 26 | 29 | 33 |
| 12 | 0792 | 0828 | 0864 | 0899 | 0934 | 0969 | 1004 | 1038 | 1072 | 1106 | 3 | 7 | 11 | 14 | 18 | 21 | 25 | 28 | 32 |
|    |      |      |      |      |      |      |      |      |      |      | 3 | 7 | 10 | 14 | 17 | 20 | 24 | 27 | 31 |
| 13 | 1139 | 1173 | 1206 | 1239 | 1271 | 1303 | 1335 | 1367 | 1399 | 1430 | 3 | 6 | 10 | 13 | 16 | 19 | 23 | 26 | 29 |
|    |      |      |      |      |      |      |      |      |      |      | 3 | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 |
| 14 | 1461 | 1492 | 1523 | 1553 | 1584 | 1614 | 1644 | 1673 | 1703 | 1732 | 3 | 6 | 9  | 12 | 15 | 19 | 22 | 25 | 28 |
|    |      |      |      |      |      |      |      |      |      |      | 3 | 6 | 9  | 12 | 14 | 17 | 20 | 23 | 26 |
| 15 | 1761 | 1790 | 1818 | 1847 | 1875 | 1903 | 1931 | 1959 | 1987 | 2014 | 3 | 6 | 9  | 11 | 14 | 17 | 20 | 23 | 26 |
|    |      |      |      |      |      |      |      |      |      |      | 3 | 6 | 8  | 11 | 14 | 17 | 19 | 22 | 25 |
| 16 | 2041 | 2068 | 2095 | 2122 | 2148 | 2175 | 2201 | 2227 | 2253 | 2279 | 3 | 6 | 8  | 11 | 14 | 16 | 19 | 22 | 24 |
|    |      |      |      |      |      |      |      |      |      |      | 3 | 5 | 8  | 10 | 13 | 16 | 18 | 21 | 23 |
| 17 | 2304 | 2330 | 2355 | 2380 | 2405 | 2430 | 2455 | 2480 | 2504 | 2529 | 3 | 5 | 8  | 10 | 13 | 15 | 18 | 20 | 23 |
|    |      |      |      |      |      |      |      |      |      |      | 3 | 5 | 8  | 10 | 12 | 15 | 17 | 20 | 22 |
| 18 | 2553 | 2577 | 2601 | 2625 | 2648 | 2672 | 2695 | 2718 | 2742 | 2765 | 2 | 5 | 7  | 9  | 12 | 14 | 17 | 19 | 21 |
|    |      |      |      |      |      |      |      |      |      |      | 2 | 4 | 7  | 9  | 11 | 14 | 16 | 18 | 21 |
| 19 | 2788 | 2810 | 2833 | 2856 | 2878 | 2900 | 2923 | 2945 | 2967 | 2989 | 2 | 4 | 7  | 9  | 11 | 13 | 16 | 18 | 20 |
|    |      |      |      |      |      |      |      |      |      |      | 2 | 4 | 6  | 8  | 11 | 13 | 15 | 17 | 19 |
| 20 | 3010 | 3032 | 3054 | 3075 | 3096 | 3118 | 3139 | 3160 | 3181 | 3201 | 2 | 4 | 6  | 8  | 11 | 13 | 15 | 17 | 19 |
| 21 | 3222 | 3243 | 3263 | 3284 | 3304 | 3324 | 3345 | 3365 | 3385 | 3404 | 2 | 4 | 6  | 8  | 10 | 12 | 14 | 16 | 18 |
| 22 | 3424 | 3444 | 3464 | 3483 | 3502 | 3522 | 3541 | 3560 | 3579 | 3598 | 2 | 4 | 6  | 8  | 10 | 12 | 14 | 15 | 17 |
| 23 | 3617 | 3636 | 3655 | 3674 | 3692 | 3711 | 3729 | 3747 | 3766 | 3784 | 2 | 4 | 6  | 7  | 9  | 11 | 13 | 15 | 17 |
| 24 | 3802 | 3820 | 3838 | 3856 | 3874 | 3892 | 3909 | 3927 | 3945 | 3962 | 2 | 4 | 5  | 7  | 9  | 11 | 12 | 14 | 16 |
| 25 | 3979 | 3997 | 4014 | 4031 | 4048 | 4065 | 4082 | 4099 | 4116 | 4133 | 2 | 3 | 5  | 7  | 9  | 10 | 12 | 14 | 15 |
| 26 | 4150 | 4166 | 4183 | 4200 | 4216 | 4232 | 4249 | 4265 | 4281 | 4298 | 2 | 3 | 5  | 7  | 8  | 10 | 11 | 14 | 15 |
| 27 | 4314 | 4330 | 4346 | 4362 | 4378 | 4393 | 4409 | 4425 | 4440 | 4456 | 2 | 3 | 5  | 6  | 8  | 9  | 11 | 13 | 14 |
| 28 | 4472 | 4487 | 4502 | 4518 | 4533 | 4548 | 4564 | 4579 | 4594 | 4609 | 2 | 3 | 5  | 6  | 8  | 9  | 11 | 12 | 14 |
| 29 | 4624 | 4639 | 4654 | 4669 | 4683 | 4698 | 4713 | 4728 | 4742 | 4757 | 1 | 3 | 4  | 6  | 7  | 9  | 10 | 12 | 13 |
| 30 | 4771 | 4786 | 4800 | 4814 | 4829 | 4843 | 4857 | 4871 | 4886 | 4900 | 1 | 3 | 4  | 6  | 7  | 9  | 10 | 11 | 13 |
| 31 | 4914 | 4928 | 4942 | 4955 | 4969 | 4983 | 4997 | 5011 | 5024 | 5038 | 1 | 3 | 4  | 6  | 7  | 8  | 10 | 11 | 12 |
| 32 | 5051 | 5065 | 5079 | 5092 | 5105 | 5119 | 5132 | 5145 | 5159 | 5172 | 1 | 3 | 4  | 5  | 7  | 8  | 9  | 11 | 12 |
| 33 | 5185 | 5198 | 5211 | 5224 | 5237 | 5250 | 5263 | 5276 | 5289 | 5302 | 1 | 3 | 4  | 5  | 6  | 8  | 9  | 10 | 12 |
| 34 | 5315 | 5328 | 5340 | 5353 | 5366 | 5378 | 5391 | 5403 | 5416 | 5428 | 1 | 3 | 4  | 5  | 6  | 8  | 9  | 10 | 11 |
| 35 | 5441 | 5453 | 5465 | 5478 | 5490 | 5502 | 5514 | 5527 | 5539 | 5551 | 1 | 2 | 4  | 5  | 6  | 7  | 9  | 10 | 11 |
| 36 | 5563 | 5575 | 5587 | 5599 | 5611 | 5623 | 5635 | 5647 | 5658 | 5670 | 1 | 2 | 4  | 5  | 6  | 7  | 8  | 10 | 11 |
| 37 | 5682 | 5694 | 5705 | 5717 | 5729 | 5740 | 5752 | 5763 | 5775 | 5786 | 1 | 2 | 3  | 5  | 6  | 7  | 8  | 9  | 10 |
| 38 | 5798 | 5809 | 5821 | 5832 | 5843 | 5855 | 5866 | 5877 | 5888 | 5899 | 1 | 2 | 3  | 5  | 6  | 7  | 8  | 9  | 10 |
| 39 | 5911 | 5922 | 5933 | 5944 | 5955 | 5966 | 5977 | 5988 | 5999 | 6010 | 1 | 2 | 3  | 4  | 5  | 7  | 8  | 9  | 10 |
| 40 | 6021 | 6031 | 6042 | 6053 | 6064 | 6075 | 6085 | 6096 | 6107 | 6117 | 1 | 2 | 3  | 4  | 5  | 6  | 8  | 9  | 10 |
| 41 | 6128 | 6138 | 6149 | 6160 | 6170 | 6180 | 6191 | 6201 | 6212 | 6222 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 42 | 6232 | 6243 | 6253 | 6263 | 6274 | 6284 | 6294 | 6304 | 6314 | 6325 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 43 | 6335 | 6345 | 6355 | 6365 | 6375 | 6385 | 6395 | 6405 | 6415 | 6425 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 44 | 6435 | 6444 | 6454 | 6464 | 6474 | 6484 | 6493 | 6503 | 6513 | 6522 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 45 | 6532 | 6542 | 6551 | 6561 | 6571 | 6580 | 6590 | 6599 | 6609 | 6618 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 46 | 6628 | 6637 | 6646 | 6656 | 6665 | 6675 | 6684 | 6693 | 6702 | 6712 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 7  | 8  |
| 47 | 6721 | 6730 | 6739 | 6749 | 6758 | 6767 | 6776 | 6785 | 6794 | 6803 | 1 | 2 | 3  | 4  | 5  | 5  | 6  | 7  | 8  |
| 48 | 6812 | 6821 | 6830 | 6839 | 6848 | 6857 | 6866 | 6875 | 6884 | 6893 | 1 | 2 | 3  | 4  | 4  | 5  | 6  | 7  | 8  |
| 49 | 6902 | 6911 | 6920 | 6928 | 6937 | 6946 | 6955 | 6964 | 6972 | 6981 | 1 | 2 | 3  | 4  | 4  | 5  | 6  | 7  | 8  |



## LOGARITHMS

|    | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----|------|------|------|------|------|------|------|------|------|------|---|---|---|---|---|---|---|---|---|
| 50 | 6990 | 6998 | 7007 | 7016 | 7024 | 7033 | 7042 | 7050 | 7059 | 7067 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| 51 | 7076 | 7084 | 7093 | 7101 | 7110 | 7118 | 7126 | 7135 | 7143 | 7152 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| 52 | 7160 | 7168 | 7177 | 7185 | 7193 | 7202 | 7210 | 7218 | 7226 | 7235 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 |
| 53 | 7243 | 7251 | 7259 | 7267 | 7275 | 7284 | 7292 | 7300 | 7308 | 7316 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| 54 | 7324 | 7332 | 7340 | 7348 | 7356 | 7364 | 7372 | 7380 | 7388 | 7396 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| 55 | 7404 | 7412 | 7419 | 7427 | 7435 | 7443 | 7451 | 7459 | 7466 | 7474 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 56 | 7482 | 7490 | 7497 | 7505 | 7513 | 7520 | 7528 | 7536 | 7543 | 7551 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 57 | 7559 | 7566 | 7574 | 7582 | 7589 | 7597 | 7604 | 7612 | 7619 | 7627 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 58 | 7634 | 7642 | 7649 | 7657 | 7664 | 7672 | 7679 | 7686 | 7694 | 7701 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| 59 | 7709 | 7716 | 7723 | 7731 | 7738 | 7745 | 7752 | 7760 | 7767 | 7774 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| 60 | 7782 | 7789 | 7796 | 7803 | 7810 | 7818 | 7825 | 7832 | 7839 | 7846 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 61 | 7853 | 7860 | 7868 | 7875 | 7882 | 7889 | 7896 | 7903 | 7910 | 7917 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 62 | 7924 | 7931 | 7938 | 7945 | 7952 | 7959 | 7966 | 7973 | 7980 | 7987 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 |
| 63 | 7993 | 8000 | 8007 | 8014 | 8021 | 8028 | 8035 | 8041 | 8048 | 8055 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 64 | 8062 | 8069 | 8075 | 8082 | 8089 | 8096 | 8102 | 8109 | 8116 | 8122 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 65 | 8129 | 8136 | 8142 | 8149 | 8156 | 8162 | 8169 | 8176 | 8182 | 8189 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 66 | 8195 | 8202 | 8209 | 8215 | 8222 | 8228 | 8235 | 8241 | 8248 | 8254 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 67 | 8261 | 8267 | 8274 | 8280 | 8287 | 8293 | 8299 | 8306 | 8312 | 8319 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 68 | 8325 | 8331 | 8338 | 8344 | 8351 | 8357 | 8363 | 8370 | 8376 | 8382 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 69 | 8388 | 8395 | 8401 | 8407 | 8414 | 8420 | 8426 | 8432 | 8439 | 8445 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 70 | 8451 | 8457 | 8463 | 8470 | 8476 | 8482 | 8488 | 8494 | 8500 | 8506 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 71 | 8513 | 8519 | 8525 | 8531 | 8537 | 8543 | 8549 | 8555 | 8561 | 8567 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 72 | 8573 | 8579 | 8585 | 8591 | 8597 | 8603 | 8609 | 8615 | 8621 | 8627 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 73 | 8633 | 8639 | 8645 | 8651 | 8657 | 8663 | 8669 | 8675 | 8681 | 8686 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 74 | 8692 | 8698 | 8704 | 8710 | 8716 | 8722 | 8727 | 8733 | 8739 | 8745 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 75 | 8751 | 8756 | 8762 | 8768 | 8774 | 8779 | 8785 | 8791 | 8797 | 8802 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 76 | 8808 | 8814 | 8820 | 8825 | 8831 | 8837 | 8842 | 8848 | 8854 | 8859 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 77 | 8865 | 8871 | 8876 | 8882 | 8887 | 8893 | 8899 | 8904 | 8910 | 8915 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 78 | 8921 | 8927 | 8932 | 8938 | 8943 | 8949 | 8954 | 8960 | 8965 | 8971 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 79 | 8976 | 8982 | 8987 | 8993 | 8998 | 9004 | 9009 | 9015 | 9020 | 9025 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 80 | 9031 | 9036 | 9042 | 9047 | 9053 | 9058 | 9063 | 9069 | 9074 | 9079 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 81 | 9085 | 9090 | 9096 | 9101 | 9106 | 9112 | 9117 | 9122 | 9128 | 9133 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 82 | 9138 | 9143 | 9149 | 9154 | 9159 | 9165 | 9170 | 9175 | 9180 | 9186 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 83 | 9191 | 9196 | 9201 | 9206 | 9212 | 9217 | 9222 | 9227 | 9232 | 9238 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 84 | 9243 | 9248 | 9253 | 9258 | 9263 | 9269 | 9274 | 9279 | 9284 | 9289 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 85 | 9294 | 9299 | 9304 | 9309 | 9315 | 9320 | 9325 | 9330 | 9335 | 9340 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 86 | 9345 | 9350 | 9355 | 9360 | 9365 | 9370 | 9375 | 9380 | 9385 | 9390 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 87 | 9395 | 9400 | 9405 | 9410 | 9415 | 9420 | 9425 | 9430 | 9435 | 9440 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 88 | 9445 | 9450 | 9455 | 9460 | 9465 | 9469 | 9474 | 9479 | 9484 | 9489 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 89 | 9494 | 9499 | 9504 | 9509 | 9513 | 9518 | 9523 | 9528 | 9533 | 9538 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 90 | 9542 | 9547 | 9552 | 9557 | 9562 | 9566 | 9571 | 9576 | 9581 | 9586 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 91 | 9590 | 9595 | 9600 | 9605 | 9609 | 9614 | 9619 | 9624 | 9628 | 9633 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 92 | 9638 | 9643 | 9647 | 9652 | 9657 | 9661 | 9666 | 9671 | 9675 | 9680 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 93 | 9685 | 9689 | 9694 | 9699 | 9703 | 9708 | 9713 | 9717 | 9722 | 9727 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 94 | 9731 | 9736 | 9741 | 9745 | 9750 | 9754 | 9759 | 9763 | 9768 | 9773 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 95 | 9777 | 9782 | 9786 | 9791 | 9795 | 9800 | 9805 | 9809 | 9814 | 9818 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 96 | 9823 | 9827 | 9832 | 9836 | 9841 | 9845 | 9850 | 9854 | 9859 | 9863 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 97 | 9868 | 9872 | 9877 | 9881 | 9886 | 9890 | 9894 | 9899 | 9903 | 9908 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 98 | 9912 | 9917 | 9921 | 9926 | 9930 | 9934 | 9939 | 9943 | 9948 | 9952 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 99 | 9956 | 9961 | 9965 | 9969 | 9974 | 9978 | 9983 | 9987 | 9991 | 9996 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 |



ANTILOGARITHMS

|      | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------|------|------|------|------|------|------|------|------|------|------|---|---|---|---|---|---|---|---|---|
| 0.00 | 1000 | 1002 | 1005 | 1007 | 1009 | 1012 | 1014 | 1016 | 1019 | 1021 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.01 | 1023 | 1026 | 1028 | 1030 | 1033 | 1035 | 1038 | 1040 | 1042 | 1045 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.02 | 1047 | 1050 | 1052 | 1054 | 1057 | 1059 | 1062 | 1064 | 1067 | 1069 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.03 | 1072 | 1074 | 1076 | 1079 | 1081 | 1084 | 1086 | 1089 | 1091 | 1094 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.04 | 1096 | 1099 | 1102 | 1104 | 1107 | 1109 | 1112 | 1114 | 1117 | 1119 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.05 | 1122 | 1125 | 1127 | 1130 | 1132 | 1135 | 1138 | 1140 | 1143 | 1146 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.06 | 1148 | 1151 | 1153 | 1156 | 1159 | 1161 | 1164 | 1167 | 1169 | 1172 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.07 | 1175 | 1178 | 1180 | 1183 | 1186 | 1189 | 1191 | 1194 | 1197 | 1199 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.08 | 1202 | 1205 | 1208 | 1211 | 1213 | 1216 | 1219 | 1222 | 1225 | 1227 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 0.09 | 1230 | 1233 | 1236 | 1239 | 1242 | 1245 | 1247 | 1250 | 1253 | 1256 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 0.10 | 1259 | 1262 | 1265 | 1268 | 1271 | 1274 | 1276 | 1279 | 1282 | 1285 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 0.11 | 1288 | 1291 | 1294 | 1297 | 1300 | 1303 | 1306 | 1309 | 1312 | 1315 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.12 | 1318 | 1321 | 1324 | 1327 | 1330 | 1334 | 1337 | 1340 | 1343 | 1346 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.13 | 1349 | 1352 | 1355 | 1358 | 1361 | 1365 | 1368 | 1371 | 1374 | 1377 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.14 | 1380 | 1384 | 1387 | 1390 | 1393 | 1396 | 1400 | 1403 | 1406 | 1409 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.15 | 1413 | 1416 | 1419 | 1422 | 1426 | 1429 | 1432 | 1435 | 1439 | 1442 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.16 | 1445 | 1449 | 1452 | 1455 | 1459 | 1462 | 1466 | 1469 | 1472 | 1476 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.17 | 1479 | 1483 | 1486 | 1489 | 1493 | 1496 | 1500 | 1503 | 1507 | 1510 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.18 | 1514 | 1517 | 1521 | 1524 | 1528 | 1531 | 1535 | 1538 | 1542 | 1545 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.19 | 1549 | 1552 | 1556 | 1560 | 1563 | 1567 | 1570 | 1574 | 1578 | 1581 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.20 | 1585 | 1589 | 1592 | 1596 | 1600 | 1603 | 1607 | 1611 | 1614 | 1618 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.21 | 1622 | 1626 | 1629 | 1633 | 1637 | 1641 | 1644 | 1648 | 1652 | 1656 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.22 | 1660 | 1663 | 1667 | 1671 | 1675 | 1679 | 1683 | 1687 | 1690 | 1694 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.23 | 1698 | 1702 | 1706 | 1710 | 1714 | 1718 | 1722 | 1726 | 1730 | 1734 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.24 | 1738 | 1742 | 1746 | 1750 | 1754 | 1758 | 1762 | 1766 | 1770 | 1774 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.25 | 1778 | 1782 | 1786 | 1791 | 1795 | 1799 | 1803 | 1807 | 1811 | 1816 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.26 | 1820 | 1824 | 1828 | 1832 | 1837 | 1841 | 1845 | 1849 | 1854 | 1858 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.27 | 1862 | 1866 | 1871 | 1875 | 1879 | 1884 | 1888 | 1892 | 1897 | 1901 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.28 | 1905 | 1910 | 1914 | 1919 | 1923 | 1928 | 1932 | 1936 | 1941 | 1945 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.29 | 1950 | 1954 | 1959 | 1963 | 1968 | 1972 | 1977 | 1982 | 1986 | 1991 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.30 | 1995 | 2000 | 2004 | 2009 | 2014 | 2018 | 2023 | 2028 | 2032 | 2037 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.31 | 2042 | 2046 | 2051 | 2056 | 2061 | 2065 | 2070 | 2075 | 2080 | 2084 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.32 | 2089 | 2094 | 2099 | 2104 | 2109 | 2113 | 2118 | 2123 | 2128 | 2133 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.33 | 2138 | 2143 | 2148 | 2153 | 2158 | 2163 | 2168 | 2173 | 2178 | 2183 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.34 | 2188 | 2193 | 2198 | 2203 | 2208 | 2213 | 2218 | 2223 | 2228 | 2234 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.35 | 2239 | 2244 | 2249 | 2254 | 2259 | 2265 | 2270 | 2275 | 2280 | 2286 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.36 | 2291 | 2296 | 2301 | 2307 | 2312 | 2317 | 2323 | 2328 | 2333 | 2339 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.37 | 2344 | 2350 | 2355 | 2360 | 2366 | 2371 | 2377 | 2382 | 2388 | 2393 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.38 | 2399 | 2404 | 2410 | 2415 | 2421 | 2427 | 2432 | 2438 | 2443 | 2449 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.39 | 2455 | 2460 | 2466 | 2472 | 2477 | 2483 | 2489 | 2495 | 2500 | 2506 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.40 | 2512 | 2518 | 2523 | 2529 | 2535 | 2541 | 2547 | 2553 | 2559 | 2564 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.41 | 2570 | 2576 | 2582 | 2588 | 2594 | 2600 | 2606 | 2612 | 2618 | 2624 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.42 | 2630 | 2636 | 2642 | 2649 | 2655 | 2661 | 2667 | 2673 | 2679 | 2685 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.43 | 2692 | 2698 | 2704 | 2710 | 2716 | 2723 | 2729 | 2735 | 2742 | 2748 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.44 | 2754 | 2761 | 2767 | 2773 | 2780 | 2786 | 2793 | 2799 | 2805 | 2812 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.45 | 2818 | 2825 | 2831 | 2838 | 2844 | 2851 | 2858 | 2864 | 2871 | 2877 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.46 | 2884 | 2891 | 2897 | 2904 | 2911 | 2917 | 2924 | 2931 | 2938 | 2944 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.47 | 2951 | 2958 | 2965 | 2972 | 2979 | 2985 | 2992 | 2999 | 3006 | 3013 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.48 | 3020 | 3027 | 3034 | 3041 | 3048 | 3055 | 3062 | 3069 | 3076 | 3083 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.49 | 3090 | 3097 | 3105 | 3112 | 3119 | 3126 | 3133 | 3141 | 3148 | 3155 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |



## ANTILOGARITHMS

|      | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
|------|------|------|------|------|------|------|------|------|------|------|---|---|---|---|----|----|----|----|----|
| 0.50 | 3162 | 3170 | 3177 | 3184 | 3192 | 3199 | 3206 | 3214 | 3221 | 3228 | 1 | 1 | 2 | 3 | 4  | 4  | 5  | 6  | 7  |
| 0.51 | 3236 | 3243 | 3251 | 3258 | 3266 | 3273 | 3281 | 3289 | 3296 | 3304 | 1 | 2 | 2 | 3 | 4  | 5  | 5  | 6  | 7  |
| 0.52 | 3311 | 3319 | 3327 | 3334 | 3342 | 3350 | 3357 | 3365 | 3373 | 3381 | 1 | 2 | 2 | 3 | 4  | 5  | 5  | 6  | 7  |
| 0.53 | 3388 | 3396 | 3404 | 3412 | 3420 | 3428 | 3436 | 3443 | 3451 | 3459 | 1 | 2 | 2 | 3 | 4  | 5  | 6  | 6  | 7  |
| 0.54 | 3467 | 3475 | 3483 | 3491 | 3499 | 3508 | 3516 | 3524 | 3532 | 3540 | 1 | 2 | 2 | 3 | 4  | 5  | 6  | 6  | 7  |
| 0.55 | 3548 | 3556 | 3565 | 3573 | 3581 | 3589 | 3597 | 3606 | 3614 | 3622 | 1 | 2 | 2 | 3 | 4  | 5  | 6  | 7  | 7  |
| 0.56 | 3631 | 3639 | 3648 | 3656 | 3664 | 3673 | 3681 | 3690 | 3698 | 3707 | 1 | 2 | 3 | 3 | 4  | 5  | 6  | 7  | 8  |
| 0.57 | 3715 | 3724 | 3733 | 3741 | 3750 | 3758 | 3767 | 3776 | 3784 | 3793 | 1 | 2 | 3 | 3 | 4  | 5  | 6  | 7  | 8  |
| 0.58 | 3802 | 3811 | 3819 | 3828 | 3837 | 3846 | 3855 | 3864 | 3873 | 3882 | 1 | 2 | 3 | 4 | 4  | 5  | 6  | 7  | 8  |
| 0.59 | 3890 | 3899 | 3908 | 3917 | 3926 | 3936 | 3945 | 3954 | 3963 | 3972 | 1 | 2 | 3 | 4 | 5  | 5  | 6  | 7  | 8  |
| 0.60 | 3981 | 3990 | 3999 | 4009 | 4018 | 4027 | 4036 | 4046 | 4055 | 4064 | 1 | 2 | 3 | 4 | 5  | 6  | 6  | 7  | 8  |
| 0.61 | 4074 | 4083 | 4093 | 4102 | 4111 | 4121 | 4130 | 4140 | 4150 | 4159 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.62 | 4169 | 4178 | 4188 | 4198 | 4207 | 4217 | 4227 | 4236 | 4246 | 4256 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.63 | 4266 | 4276 | 4285 | 4295 | 4305 | 4315 | 4325 | 4335 | 4345 | 4355 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.64 | 4365 | 4375 | 4385 | 4396 | 4406 | 4416 | 4426 | 4436 | 4446 | 4457 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.65 | 4467 | 4477 | 4487 | 4498 | 4508 | 4519 | 4529 | 4539 | 4550 | 4560 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.66 | 4571 | 4581 | 4592 | 4603 | 4613 | 4624 | 4634 | 4645 | 4656 | 4667 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 9  | 10 |
| 0.67 | 4677 | 4688 | 4699 | 4710 | 4721 | 4732 | 4742 | 4753 | 4764 | 4775 | 1 | 2 | 3 | 4 | 5  | 7  | 8  | 9  | 10 |
| 0.68 | 4786 | 4797 | 4808 | 4819 | 4831 | 4842 | 4853 | 4864 | 4875 | 4887 | 1 | 2 | 3 | 4 | 6  | 7  | 8  | 9  | 10 |
| 0.69 | 4898 | 4909 | 4920 | 4932 | 4943 | 4955 | 4966 | 4977 | 4989 | 5000 | 1 | 2 | 3 | 5 | 6  | 7  | 8  | 9  | 10 |
| 0.70 | 5012 | 5023 | 5035 | 5047 | 5058 | 5070 | 5082 | 5093 | 5105 | 5117 | 1 | 2 | 4 | 5 | 6  | 7  | 8  | 9  | 11 |
| 0.71 | 5129 | 5140 | 5152 | 5164 | 5176 | 5188 | 5200 | 5212 | 5224 | 5236 | 1 | 2 | 4 | 5 | 6  | 7  | 8  | 10 | 11 |
| 0.72 | 5248 | 5260 | 5272 | 5284 | 5297 | 5309 | 5321 | 5333 | 5346 | 5348 | 1 | 2 | 4 | 5 | 6  | 7  | 9  | 10 | 11 |
| 0.73 | 5370 | 5383 | 5395 | 5408 | 5420 | 5433 | 5445 | 5458 | 5470 | 5483 | 1 | 3 | 4 | 5 | 6  | 8  | 9  | 10 | 11 |
| 0.74 | 5495 | 5508 | 5521 | 5534 | 5546 | 5559 | 5572 | 5585 | 5598 | 5610 | 1 | 3 | 4 | 5 | 6  | 8  | 9  | 10 | 12 |
| 0.75 | 5623 | 5636 | 5649 | 5662 | 5675 | 5689 | 5702 | 5715 | 5728 | 5741 | 1 | 3 | 4 | 5 | 7  | 8  | 9  | 10 | 12 |
| 0.76 | 5754 | 5768 | 5781 | 5794 | 5808 | 5821 | 5834 | 5848 | 5861 | 5875 | 1 | 3 | 4 | 5 | 7  | 8  | 9  | 11 | 12 |
| 0.77 | 5888 | 5902 | 5916 | 5929 | 5943 | 5957 | 5970 | 5984 | 5998 | 6012 | 1 | 3 | 4 | 5 | 7  | 8  | 10 | 11 | 12 |
| 0.78 | 6026 | 6039 | 6053 | 6067 | 6081 | 6095 | 6109 | 6124 | 6138 | 6152 | 1 | 3 | 4 | 6 | 7  | 8  | 10 | 11 | 13 |
| 0.79 | 6166 | 6180 | 6194 | 6209 | 6223 | 6237 | 6252 | 6266 | 6281 | 6295 | 1 | 3 | 4 | 6 | 7  | 8  | 10 | 11 | 13 |
| 0.80 | 6310 | 6324 | 6339 | 6353 | 6368 | 6383 | 6397 | 6412 | 6427 | 6442 | 1 | 3 | 4 | 6 | 7  | 9  | 10 | 12 | 13 |
| 0.81 | 6457 | 6471 | 6486 | 6501 | 6516 | 6531 | 6546 | 6561 | 6577 | 6592 | 2 | 3 | 5 | 6 | 8  | 9  | 11 | 12 | 14 |
| 0.82 | 6607 | 6622 | 6637 | 6653 | 6668 | 6683 | 6699 | 6714 | 6730 | 6745 | 2 | 3 | 5 | 6 | 8  | 9  | 11 | 12 | 14 |
| 0.83 | 6761 | 6776 | 6792 | 6808 | 6823 | 6839 | 6855 | 6871 | 6887 | 6902 | 2 | 3 | 5 | 6 | 8  | 9  | 11 | 13 | 14 |
| 0.84 | 6918 | 6934 | 6950 | 6966 | 6982 | 6998 | 7015 | 7031 | 7047 | 7063 | 2 | 3 | 5 | 6 | 8  | 10 | 11 | 13 | 15 |
| 0.85 | 7079 | 7096 | 7112 | 7129 | 7145 | 7161 | 7178 | 7194 | 7211 | 7228 | 2 | 3 | 5 | 7 | 8  | 10 | 12 | 13 | 15 |
| 0.86 | 7244 | 7261 | 7278 | 7295 | 7311 | 7328 | 7345 | 7362 | 7379 | 7396 | 2 | 3 | 5 | 7 | 8  | 10 | 12 | 13 | 15 |
| 0.87 | 7413 | 7430 | 7447 | 7464 | 7482 | 7499 | 7516 | 7534 | 7551 | 7568 | 2 | 3 | 5 | 7 | 9  | 10 | 12 | 14 | 16 |
| 0.88 | 7586 | 7603 | 7621 | 7638 | 7656 | 7674 | 7691 | 7709 | 7727 | 7745 | 2 | 4 | 5 | 7 | 8  | 11 | 12 | 14 | 16 |
| 0.89 | 7762 | 7780 | 7798 | 7816 | 7834 | 7852 | 7870 | 7889 | 7907 | 7925 | 2 | 4 | 5 | 7 | 9  | 11 | 13 | 14 | 16 |
| 0.90 | 7943 | 7962 | 7980 | 7998 | 8017 | 8035 | 8054 | 8072 | 8091 | 8110 | 2 | 4 | 6 | 7 | 9  | 11 | 13 | 15 | 17 |
| 0.91 | 8128 | 8147 | 8166 | 8185 | 8204 | 8222 | 8241 | 8260 | 8279 | 8299 | 2 | 4 | 6 | 8 | 9  | 11 | 13 | 15 | 17 |
| 0.92 | 8318 | 8337 | 8356 | 8375 | 8395 | 8414 | 8433 | 8453 | 8472 | 8492 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 15 | 17 |
| 0.93 | 8511 | 8531 | 8551 | 8570 | 8590 | 8610 | 8630 | 8650 | 8670 | 8690 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 0.94 | 8710 | 8730 | 8750 | 8770 | 8790 | 8810 | 8831 | 8851 | 8872 | 8892 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 0.95 | 8913 | 8933 | 8954 | 8974 | 8995 | 9016 | 9036 | 9057 | 9078 | 9099 | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 17 | 19 |
| 0.96 | 9120 | 9141 | 9162 | 9183 | 9204 | 9220 | 9247 | 9268 | 9290 | 9311 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 17 | 19 |
| 0.97 | 9333 | 9354 | 9376 | 9397 | 9419 | 9441 | 9462 | 9484 | 9506 | 9528 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 17 | 20 |
| 0.98 | 9550 | 9572 | 9594 | 9616 | 9638 | 9661 | 9683 | 9705 | 9727 | 9750 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 |
| 0.99 | 9772 | 9795 | 9817 | 9840 | 9863 | 9886 | 9908 | 9931 | 9954 | 9977 | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 18 | 20 |