# MATHS

## BOOKS - VIKAS GUPTA MATHS (HINGLISH)

## LOGARITHMS

### Exercise 1 Single Choice Problems

1. Solution set of the in equality $\log_{10^2} x - 3(\log_{10} x)(\log_{10}(x-2)) + 2\log_{10^2}(x-2) < 0$, is :

A. $(0, 4)$

B. $(-\infty, 1)$

C. $(4, \infty)$

D. $(2, 4)$

**Answer: C**

Watch Video Solution

**2.** The number of real solution(s) of the equation $9^{\log_3(\log_e x)} = \log_e x - (\log_e x)^2 + 1$ is equal to

A. 0

B. 1

C. 2

D. 3

**Answer: B**

Watch Video Solution

**3.** If a, b, c are positive numbers such that $a^{\log_3 7} = 27, b^{\log_7 11} = 49, c^{\log_{11} 25} = \sqrt{11}$, then the sum of digits of $S = a^{(\log_3 7)^2} + b^{(\log_7 11)^2} + c^{(\log_{11} 25)^2}$ is :

A. 15

B. 17

C. 19

D. 21

**Answer: C**

Watch Video Solution

**4.** Least positive integral value of 'a' for which $\log_{\left(x+\frac{1}{x}\right)}\left(a^2-3a+3\right)>0, (x>0)$ :

A. 1

B. 2

C. 3

D. 4

**Answer: C**

Watch Video Solution

5. Let $P = \frac{5}{\frac{1}{\log_2 x} + \frac{1}{\log_3 x} + \frac{1}{\log_4 x} + \frac{1}{\log_5 x}}$ and $(120)^P = 32,$ then the value of x be :

A. 1

B. 2

C. 3

D. 4

**Answer: B**

Watch Video Solution

6. Let x,y,z be positive real numbers such that $\log_{2x} z = 3, \log_{5y} z = 6$ and $\log_{xy} z = \frac{2}{3}$ then the value of z is

A. $\frac{1}{5}$

B. $\frac{1}{10}$

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

D. $\frac{4}{9}$

**Answer: B**

Watch Video Solution

7. Sum of values of x and y satisfying $\log_x(\log_3(\log_x y)) = 0$ and $\log_y 27 = 1$ is :

A. 27

B. 30

C. 33

D. 36

**Answer: B**

Watch Video Solution

**8.** $\log_{0.01} 1000 + \log_{0.1} 0.0001$ is equal to :

A. -2

B. 3

C. $-5/2$

D. $5/2$

**Answer: D**

Watch Video Solution

**9.** If $(\log)_{12} 27 = a,$ then find $(\log)_6 16 \int ermsofa$

A. $2\left(\frac{3-a}{3+a}\right)$

B. $3\left(\frac{3-a}{3+a}\right)$

C. $4\left(\frac{3-a}{3+a}\right)$

D. None of these

**Answer: C**

Watch Video Solution

**10.** If $\log_2(\log_2(\log_3 x)) = \log_2(\log_3(\log_2 y)) = 0$, then the value of $(x + y)$ is

A. 17

B. 9

C. 21

D. 19

**Answer: A**

Watch Video Solution

**11.** Suppose that a and b are positive real numbers such that $\log_{27} a + \log_9(b) = \frac{7}{2}$ and $\log_{27} b + \log_9 a = \frac{2}{3}$.Then the value of the $ab$

equals

A. 81

B. 243

C. 27

D. 729

**Answer: B**

Watch Video Solution

**12.** If $2^a = 5, 5^b = 8, 8^c = 11 \text{ and } 11^d = 14$, then the value of $2^{abcd}$ is :

A. 1

B. 2

C. 7

D. 14

**Answer: D**

Watch Video Solution

**13.** Which of the following conditions necessarily imply that the real number x is rational, I $x^2$ is rational II $x^3$and $x^5$are rational III $x^2$and $x^3$ are rational

A. I and II only

B. I and III only

C. II and III only

D. III only

**Answer: C**

Watch Video Solution

**14.** The value of $\frac{\log_8 17}{\log_9 23} - \frac{\log_{2\sqrt{2}} 17}{\log_3 23}$ is equal to

A. -1

B. 0

C. $\dfrac{\log_2 17}{\log_3 23}$

D. $\dfrac{4(\log_2 17)}{3(\log_3 23)}$

**Answer: B**

Watch Video Solution

**15.** The true solution set of inequality $\log_{(2x-3)}(3x-4) > 0$ is equal to :

A. $\left(\frac{4}{3}, \frac{5}{3}\right) \cup (2, \infty)$

B. $\left(\frac{3}{2}, \frac{5}{3}\right) \cup (2, \infty)$

C. $\left(\frac{4}{3}, \frac{3}{2}\right) \cup (2, \infty)$

D. $\left(\frac{2}{3}, \frac{4}{3}\right) \cup (2, \infty)$

**Answer: B**

Watch Video Solution

**16.** If P is the number of natural numbers whose logarithms to the base 10 have the the charecteristic p and Q is the numbers of natural numbers logarithms of whose reciprocal to the base 10 have the charecteristics -q. then find the value of $\log_{10}P - \log_{10}Q$

A. $p - q + 1$

B. $p - q$

C. $p + q - 1$

D. $p - q - 1$

**Answer: A**

Watch Video Solution

**17.** If $2^{2010} = a_n 10^n + a_{n-1} 10^{n-1} + \ldots\ldots\ldots\ldots + a_2 10^2 + a_1 \cdot 10 + a_0$, where $a_i \in \{0, 1, 2, \ldots\ldots\ldots, 9\}$ for all $i = 0, 1, 2, 3, \ldots\ldots\ldots\ldots, n$, then $n =$

A. 603

B. 604

C. 605

D. 606

**Answer: C**

View Text Solution

**18.** The number of zeros after decimal before the start of any significant digit in the number $N = (0.15)^{20}$ are :

A. 15

B. 16

C. 17

D. 18

**Answer: B**

Watch Video Solution

**19.** $\log_2\left[\log_4\left(\log_{10}16^4+\log_{10}25^8\right)\right]$ simplifies to :

A. an irrational

B. an odd prime

C. a composite

D. unity

**Answer: D**

Watch Video Solution

**20.** The sum of all the solutions to the equations $2\log_{10}x-\log_{10}(2x-75)=2$

A. 30

B. 350

C. 75

D. 200

**Answer: D**

Watch Video Solution

**21.** $x^{(\log_x)\log_a y \log_y z}$ is equal to

A. x

B. y

C. z

D. $x^x$

**Answer: C**

Watch Video Solution

**22.** Number of solution(s) of the equation $x^{x\sqrt{x}} = \left(x\sqrt{x}\right)^{x}$ is/are :

A. 0

B. 1

C. 2

D. 3

**Answer: C**

Watch Video Solution

**23.** The difference of roots of the equation $\left((\log)_{27}x^{3}\right)^{2} = (\log)_{27}x^{6}$ is .......

A. $\frac{2}{3}$

B. 1

C. 9

D. 8

**Answer: D**

Watch Video Solution

**24.** If $\log_{10} x + \log_{10} y = 2, x - y = 15$ then :

A. $(x, y)$ lies on the line $y = 4x + 3$

B. $(x, y)$ lies on $y^2 = 4x$

C. $(x, y)$ lies on $x = 4y$

D. $(x, y)$ lies on $4x = y$

**Answer: C**

Watch Video Solution

**25.** $\sqrt{2^x \left(4^x (0.\ 125)^{\frac{1}{x}}\right)^{\frac{1}{3}}} = 4.\ \left(2^{\frac{1}{3}}\right)$

A. $\dfrac{14}{5}$

B. 3

C. $-\frac{1}{5}$

D. $-\frac{3}{5}$

**Answer: D**

Watch Video Solution

**26.** Sum of all values of x satisfying the equation $25^{2x-x^2+1}+9^{2x-x^2+1}=34\left(15^{2x-x^2}\right)$ is:

A. 1

B. 2

C. 3

D. 4

**Answer: D**

Watch Video Solution

**27.** If $a^{x}=b^{y}=c^{z}=d^{w}$, show that $\log_{a}(bcd)=x\left(\frac{1}{y}+\frac{1}{z}+\frac{1}{w}\right)$.

A. $z\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{w}\right)$

B. $y\left(\frac{1}{x}+\frac{1}{z}+\frac{1}{w}\right)$

C. $x\left(\frac{1}{y}+\frac{1}{z}+\frac{1}{w}\right)$

D. $\frac{xyz}{w}$

**Answer: C**

Watch Video Solution

**28.** If $x=\frac{4}{\left(5^{0.5}+1\right)\left(5^{0.25}+1\right)\left(5^{0.125}+1\right)\left(x^{0.0625}+1\right)}$ .Then the value of $(1+x)^{48}$ ,is.

A. 5

B. 25

C. 125

D. 625

**Answer: C**

Watch Video Solution

**29.** If $\log_x \log_{18}\left(\sqrt{2}+\sqrt{8}\right) = \frac{1}{3}$, then the value of $32x =$

A. 2

B. 4

C. 6

D. 8

**Answer: B**

Watch Video Solution

**30.** Let $n \in N$, $f(n) = \begin{cases} \log_8 n & \text{if } \log_8 n \text{ is integer} \\ 0 & \text{otherwise} \end{cases}$, then the valud of $\sum_{n=1}^{2011} f(n)$ is :

A. 2011

B. $2011 \times 1006$

C. 6

D. $2^{2011}$

**Answer: C**

Watch Video Solution

**31.** If the equation $\dfrac{\log_{12}(\log_8(\log_4 x))}{\log_5\left(\log_4\left(\log_y(\log_2 x)\right)\right)} = 0$ has a solution for 'x' when $c < y < b$, $y \neq a$, where 'b' is as large as possible, then the value of $(a + b + c)$ is equals to :

A. 18

B. 19

C. 20

D. 21

**Answer: B**

Watch Video Solution

**32.** If $(\log)_{0.3}(x-1) < (\log)_{0.09}(x-1)$, then $x$ lies in the interval $(2, \infty)$ (b) $(1, 2)$ $(-2, -1)$ (d) None of these

A. $(2, \infty)$

B. $(1, 2)$

C. $(-2, -1)$

D. $\left(1, \frac{3}{2}\right)$

**Answer: A**

Watch Video Solution

**33.** Number of solutions of equation $\sqrt{7^{2x^2 - 5x - 6}} = (\sqrt{2})^{3 \log_2 49}$

A. 2

B. 1

C. 4

D. 5

**Answer: C**

Watch Video Solution

**34.** Let $1 \leq x \leq 256$ and M be the maximum value of $(\log_2 x)^4 + 16(\log_2 x)^2 \log_2\left(\frac{16}{x}\right)$. The sum of the digits of M is :

A. 9

B. 11

C. 13

D. 15

**Answer: C**

Watch Video Solution

**35.** Number of real solution(s) of the equation $9^{\log_3(\log x)} = lnx - (\ln x)^2 + 1$ is :

A. 0

B. 1

C. 2

D. 3

**Answer: c**

Watch Video Solution

**36.** The number of real values of the parameter $k$ for which $(\log_{16} x)^2 - (\log)_{16}x + (\log)_{16}k = 0$ with real coefficients will have exactly one solution is 2 (b) 1 (c) 4 (d) none of these

A. 1

B. 2

C. 3

D. 4

**Answer: A**

Watch Video Solution

**37.** A rational number which is 50 times its own logarithm to the base 10, is

A. 1

B. 10

C. 100

D. 1000

**Answer: C**

Watch Video Solution

**38.** If $x = \log_5(1000)$ and $y = \log_7(2058)$,then

A. $x > y$

B. $x < y$

C. $x = y$

D. none of these

**Answer: A**

Watch Video Solution

**39.** The value of $7\log\left(\frac{16}{15}\right)+5\log\left(\frac{25}{24}\right)+3\log\left(\frac{81}{80}\right)=$

A. 0

B. 1

C. log 2

D. log 3

**Answer: C**

Watch Video Solution

**40.** $\log_{10}\tan 1^\circ+\log_{10}\tan 2^\circ+\ldots..+\log_{10}\tan 89^\circ$ is equal to :

A. 0

B. 1

C. 27

D. 81

**Answer: A**

Watch Video Solution

**41.** $\log_7 \log_7 \sqrt{7\left(\sqrt{7\sqrt{7}}\right)} =$

A. $3\log_2 7$

B. $3\log_7 2$

C. $1 - 3\log_7 2$

D. $1 - 3\log_2 7$

**Answer: C**

Watch Video Solution

**42.** If $4^{\log_9(3)} + 9^{\log_2(4)} = 10^{\log_x(83)}$ then x =

A. 2

B. 3

C. 10

D. 30

**Answer: C**

Watch Video Solution

**43.** $x^{\log_{10}\left(\frac{y}{z}\right)} \cdot y^{\log_{10}\left(\frac{z}{x}\right)} \cdot z^{\log_{10}\left(\frac{x}{y}\right)}$ is equal to :

A. 0

B. 1

C. -1

D. 2

**Answer: B**

Watch Video Solution

**44.** Solve $(\log)_x 2(\log)_{2x} 2 = (\log)_{4x} 2.$

A. $\{2^{-\sqrt{2}}, 2^{\sqrt{2}}\}$

B. $\{1/2, 2\}$

C. $\{1/4, 2^2\}$

D. None of these

**Answer: A**

Watch Video Solution

**45.** The least value of the expression $2(\log)_{10} x - (\log)_x (0.01),$ for $x > 1,$ is (1980, 2M) 10 (b) 2 (c) $-0.01$ (d) None of these

A. 2

B. 4

C. 6

D. 8

**Answer: B**

Watch Video Solution

**46.** If $\sqrt{(\log)_2 x} - 0.5 = (\log)_2 \sqrt{x},$ then $x$ equals odd integer (b) prime number composite number (d) irrational

A. odd integer

B. prime number

C. composite number

D. irrational

**Answer: B**

Watch Video Solution

**47.** If $x_1 and x_2$ are the roots of the equation $e^2 x^{\ln x} = x^3$ with $x_1 > x_2$, then $x_1 = 2x_2$ (b) $x_1 = x22$ $2x_1 = x22$ (d) $x12 = x23$

A. $x_1 = 2x_2$

B. $x_1 = x_2^2$

C. $2x_1 = x_2^2$

D. $x_1^2 = x_2^2$

**Answer: B**

Watch Video Solution

**48.** Let M denote antilog $_{32}$0.6 and N denote the value of $49^{(1 - \log_7 2)} + 5^{-\log_5 4}$. Then M.N is :

A. 100

B. 400

C. 50

D. 200

**Answer: A**

Watch Video Solution

**49.** If $\log_2(\log_2(\log_3 x)) = \log_3(\log_3(\log_2 y)) = 0$, then $x - y$ is equal to :

A. 0

B. 1

C. 8

D. 9

**Answer: B**

Watch Video Solution

**50.** $|\log_{\frac{1}{2}} 10 + |\log_4 625 - |\log_{\frac{1}{2}} 5||| =$

A. $\log_{1/2} 2$

B. $\log_2 5$

C. $\log_2 2$

D. $\log_2 25$

**Answer: C**

Watch Video Solution

**51.** If $(\log)_4 5 = a and (\log)_5 6 = b$, then $(\log)_3 2$ is equal to $\frac{1}{2a+1}$ (b) $\frac{1}{2b+1}$ (c) $2ab+1$ (d) $\frac{1}{2ab-1}$

A. $\frac{1}{2a+1}$

B. $\frac{1}{2b+1}$

C. $2ab+1$

D. $\frac{1}{2ab-1}$

**Answer: D**

Watch Video Solution

**52.** If $x = \log_a bc, y = \log_b ac$ and $z = \log_c ab$ then which of the following is equal to unity ?

A. $x + y + z$

B. $xyz$

C. $\frac{1}{1+x} + \frac{1}{1+y} + \frac{1}{1+z}$

D. $(1+x) + (1+y) + (1+z)$

**Answer: C**

Watch Video Solution

**53.** $x^{(\log_x)\log_a y \log_y z}$ is equal to

A. x

B. y

C. z

D. a

**Answer: C**

Watch Video Solution

**54.** Number of value(s) of 'x' satisfying the equation $x^{\log_{\sqrt{x}}(x-3)} = 9$ is/are

A. 0

B. 1

C. 2

D. 6

**Answer: B**

Watch Video Solution

**55.** $\log_{0.01} 1000 + \log_{0.1} 0.0001$ is equal to :

A. -2

B. 3

C. $-\frac{5}{2}$

D. $\frac{5}{2}$

**Answer: D**

Watch Video Solution

**56.** Find the value of $7\log\left(\frac{16}{15}\right)+5\log\left(\frac{25}{24}\right)+3\log\left(\frac{81}{80}\right)$.

A. $2^{1/8}$

B. $(10)^{1/8}$

C. $(30)^{1/8}$

D. 1

**Answer: A**

Watch Video Solution

**57.** $\log_8(128) - \log_9 \cot\left(\frac{\pi}{3}\right) =$

A. $\frac{31}{12}$

B. $\frac{19}{12}$

C. $\frac{13}{12}$

D. $\frac{11}{12}$

**Answer: A**

Watch Video Solution

**58.** Evaluate $\left\{\left(\frac{1}{\sqrt{27}}\right)^{2-\left[\frac{\log_5 13}{2\log_5 9}\right]}\right\}^{\frac{1}{2}}$

A. $\frac{5\sqrt{2}}{27}$

B. $\frac{\sqrt{2}}{27}$

C. $\frac{4\sqrt{2}}{27}$

D. $\frac{2\sqrt{2}}{27}$

**Answer: D**

Watch Video Solution

**59.** The sum of all the roots of the equation $\log_2(x-1)+\log_2(x+2)-\log_2(3x-1)=\log_2 4$

A. 12

B. 2

C. 10

D. 11

**Answer: D**

Watch Video Solution

60. $\dfrac{(\log_{100} 10)(\log_2(\log_4 2))\left(\log_4 \log_2^2 (256)^2\right)}{\log_4 8 + \log_8 4} =$

A. $-\dfrac{6}{13}$

B. $-\dfrac{1}{2}$

C. $-\dfrac{8}{13}$

D. $-\dfrac{12}{13}$

**Answer: D**

Watch Video Solution

61. If $P = \log_5(\log_5 3)\text{and}3^C + 5^{(-P)} = 405$ then C is equal to

A. 3

B. 5

C. 4

D. 6

**Answer: C**

Watch Video Solution

**62.** A circle has radius $\log_{10}(a^2)$ and a circumference of $\log_{10}(b^4)$. Then the value of $\log_a b$ is equal to :

A. $\frac{1}{4\pi}$

B. $\frac{1}{\pi}$

C. $2\pi$

D. $\pi$

**Answer: D**

Watch Video Solution

**63.** If $2^x = 3^y = 6^{-z}$ find the value of $\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right)$

A. 0

B. 1

C. 2

D. 3

**Answer: A**

Watch Video Solution

**64.** The value of $\log_{\left(\sqrt{2}-1\right)}\left(5\sqrt{2}-7\right)$ is :

A. 0

B. 1

C. 2

D. 3

**Answer: D**

Watch Video Solution

**65.** Compute $\log_{ab}\left(\sqrt[3]{a}/\sqrt{b}\right)$ if $\log_{ab} a = 4$.

A. 2

B. $\frac{13}{6}$

C. $\frac{15}{6}$

D. $\frac{17}{6}$

**Answer: D**

Watch Video Solution

**66.** Identify the correct option

A. $\log_2 3 < \log_{1/4} 5$

B. $\log_5 7 < \log_8 3$

C. $\log_{\sqrt[3]{2}} \sqrt{3} < \log_{\sqrt[3]{2}} \sqrt{5}$

D. $2^{\frac{1}{4}} > \left(\frac{3}{2}\right)^{1/3}$

**Answer: C**

Watch Video Solution

**67.** Sum of all values of x satisfying the system of equations $5\left(\log_y x + \log_x y\right) = 26, xy = 64$ is :

A. 42

B. 34

C. 32

D. 2

**Answer: B**

Watch Video Solution

**68.** The product of all values of x satisfying the equations $\log_3 a - \log_x a = \log_{x/3} a$ is :

A. 3

B. $\frac{3}{2}$

C. 18

D. 27

**Answer: D**

Watch Video Solution

**69.** Solve for $x, y, z$.

$$\log_2 x + \log_4 y + \log_4 z = 2$$

$$\log_3 y + \log_9 z + \log_9 x = 2$$

$$\log_4 z + \log_{16} x + \log_{16} y = 2$$

A. $\frac{175}{12}$

B. $\frac{349}{24}$

C. $\frac{353}{24}$

D. $\frac{112}{3}$

**Answer: C**

Watch Video Solution

**70.** Find the value of $\left(\frac{1}{49}\right)^{1+\log_7 2}+5^{-\log_{(1/5)}(7)}$.

A. $7\frac{1}{196}$

B. $7\frac{3}{196}$

C. $7\frac{5}{196}$

D. $7\frac{1}{98}$

**Answer: A**

Watch Video Solution

**71.** Solve the equation $\log_2(3-x)-\log_2\left(\frac{\sin\frac{3\pi}{4}}{5-x}\right\}=\frac{1}{2}+\log_2(x+7)$

A. 0

B. 1

C. 2

D. 3

**Answer: B**

Watch Video Solution

**72.** if $\log_k x.\log_5 k=\log_x 5$ , $k\ne 1, k>0$ , then find the value of x

A. 5

B. $\frac{24}{5}$

C. $\frac{26}{5}$

D. $\frac{37}{5}$

**Answer: C**

Watch Video Solution

**73.** The set of real values of $x$ satisfying the equation $|x-1|^{\log_3(x^2)-2\log_x(9)}=(x-1)^7$

A. 162

B. $\frac{162}{\sqrt{3}}$

C. $\frac{81}{\sqrt{3}}$

D. 81

**Answer: A**

Watch Video Solution

**74.** The number of values of x satisfying the equation $\log_2(9^{x-1}+7)=2+\log_2(3^{x-1}+1)$ is :

A. 1

B. 2

C. 3

D. 0

**Answer: B**

Watch Video Solution

75. Which is the correct order for a given number $\alpha > 1$ in increasing order

A. $\log_2 \alpha < \log_3 \alpha < \log_e \alpha < \log_{10} \alpha$

B. $\log_{10} \alpha < \log_3 \alpha < \log_e \alpha < \log_2 \alpha$

C. $\log_{10} \alpha < \log_e \alpha < \log_2 \alpha < \log_3 \alpha$

D. $\log_3 \alpha < \log_e \alpha < \log_2 \alpha < \log_{10} \alpha$

**Answer: B**

Watch Video Solution

**76.** If $T_r = \frac{1}{\log_{2^r} 4}$ (where $r \in N$), then the value of $\sum_{r=1}^{4} T_r$ is :

A. 3

B. 4

C. 5

D. 10

**Answer: C**

Watch Video Solution

**77.** In which of the following intervals does $\frac{1}{\log_{1/2}(1/3)} + \frac{1}{\log_{1/5}(1/3)}$ lies

A. (1, 2)

B. (2, 3 )

C. (3, 4)

D. (4, 5)

**Answer: B**

Watch Video Solution

**78.** If $\sin\theta = \frac{1}{2}\left(a + \frac{1}{a}\right)$ and $\sin 3\theta = \frac{k}{2}\left(a^3 + \frac{1}{a^3}\right)$, then $k + 6$ is equal to :

A. 3

B. 4

C. 5

D. -4

**Answer: C**

Watch Video Solution

**79.** Complete set of real values of x for which $\log_{(2x-3)}(x^2-5x-6)$ is defined is :

A. $\left(\frac{3}{2}, \infty\right)$

B. $(6, \infty)$

C. $\left(\frac{3}{2}, 6\right)$

D. $\left(\frac{3}{2}, 2\right) \cup (2, \infty)$

**Answer: B**

Watch Video Solution

## Exercise 2 One Or More Than One Answer Is Are Correct

**1.** Solve the equation $\dfrac{1-2\left(\log x^2\right)^2}{\log x - 2(\log x)^2} = 1$

A. $\dfrac{1}{\sqrt{10}}$

B. $\dfrac{1}{\sqrt{20}}$

C. $\sqrt[3]{10}$

D. $\sqrt{10}$

**Answer: A::C**

Watch Video Solution

**2.** If $(\log)_a x = b$ for permissible values of $a and x$, then identify the statement(s) which can be correct. If $a and b$ are two irrational numbers, then $x$ can be rational. If $a$ is rational and $b$ is irrational, then $x$ can be rational. If $a$ is irrational and $b$ is rational, then $x$ can be rational. If $a and b$ are rational, then $x$ can be rational.

A. If a and b are two irrational numbers then x can be rational.

B. If a rational and b irrational then x can be rational .

C. If a irrational and b rational then x can be rational.

D. If a rational and b rational then x can be rational.

**Answer: A::B::C::D**

Watch Video Solution

3. Consider the quadratic equation $(\log_{10} 8)x^2 - (\log_{10} 5)x = 2(\log_2 10)^{-1} - x$. Which of the following quantities are irrational.

A. Sum of the roots

B. Product of the roots

C. Sum of the coefficients

D. Discriminant

**Answer: C::D**

Watch Video Solution

4. Let

$A = M \in i\mu m\left(x^2 - 2x + 7\right), x \in RandB = M \in i\mu m\left(x^2 - 2x + 7\right), x \in$

then: $(\log)_{(B-A)}(A+B)$ is not defined $A+B=13$

$(\log)_{(2B-A)}A<1$ (d) $(\log)_{(2A-B)}A>1$

A. $\log_{(B-A)}(A+B)$ is not defined

B. $A+B=13$

C. $\log_{(2B-A)}A<1$

D. $\log_{(2A-B)}A>1$

**Answer: A::B::C::D**

Watch Video Solution

## Exercise 3 Comprehension Type Problems

**1.** Let $\log_3 N = \alpha_1 + \beta_1$

$\log_5 N = \alpha_2 + \beta_2$

$\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2$ and $\alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0, 1)$.

Q. Number of integral values of N if $\alpha_1 = 4$ and $\alpha_2 = 2$:

A. 46

B. 45

C. 44

D. 47

**Answer: C**

Watch Video Solution

**2.** Let $\log_3 N = \alpha_1 + \beta_1$

$\log_5 N = \alpha_2 + \beta_2$

$\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2$ and $\alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0, 1)$.

Q. Largest integral value of N if $\alpha_1 = 5, \alpha_2 = 3$ and $\alpha_3 = 2$.

A. 342

B. 343

C. 243

D. 242

**Answer: A**

Watch Video Solution

**3.** Let $\log_3 N = \alpha_1 + \beta_1$

$\log_5 N = \alpha_2 + \beta_2$

$\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2$ and $\alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0, 1)$.

Q. Difference of largest and smallest values of N if $\alpha_1 = 5, \alpha_2 = 3$ and $\alpha_3 = 2$.

A. 97

B. 100

C. 98

D. 99

**Answer: D**

Watch Video Solution

**4.** If

$\log_{10}|x^3+y^3|-\log_{10}|x^2-xy+y^2|+\log_{10}|x^3-y^3|-\log_{10}|x^2+xy+y^2$

. wherex, y are integers , then (i) if $x=111$ then $y$ can be: (ii) if $y=2$then value of $x$ can be:

A. $\pm 111$

B. $\pm 2$

C. $\pm 110$

D. $\pm 109$

**Answer: C**

Watch Video Solution

**5.** If

$\log_{10}|x^3+y^3|-\log_{10}|x^2-xy+y^2|+\log_{10}|x^3-y^3|-\log_{10}|x^2+xy+y^2$

. Where x, y are integers, then

Q. If $y = 2$, then value of x can be :

A. $\pm 111$

B. $\pm 15$

C. $\pm 2$

D. $\pm 110$

**Answer: B**

Watch Video Solution

**6.** Given a right triangle ABC right angled at C and whose legs are given $1 + 4\log_{p^2}(2p), 1 + 2^{\log_2(\log_2 p)}$ and hypotenuse is given to be $1 + \log_2(4p)$. The are of $\Delta ABC$ and circle circumscribing it are $\Delta_1$ and $\Delta_2$ respectively, then

Q. $\Delta_1 + \dfrac{4\Delta_2}{\pi}$ is equal to :

A. 31

B. 28

C. $3+\frac{1}{\sqrt{2}}$

D. 199

**Answer: A**

Watch Video Solution

**7.** Given a right triangle ABC right angled at C and whose legs are given $1+4\log_{p^2}(2p), 1+2^{\log_2(\log_2(p))}$ and hypotenuse is given to be $1+\log_2(4p)$. The area of $trian \leq ABC$ and circle circumscribing it are $\Delta_1$ and$\Delta_2$ respectively.

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. $\frac{\sqrt{3}}{2}$

D. 1

**Answer: C**

Watch Video Solution

## Exercise 5 Subjective Type Problems

**1.** The number $N = 6^{\log_{10} 40} . 5^{\log_{10} 36}$ is a natural number ,Then sum of digits of N is :

Watch Video Solution

**2.** The minimum value of 'c' such that $\log_b\left(a^{\log_2 b}\right) = \log_a\left(b^{\log_2 b}\right)$ and $\log_a\left(c - (b-a)^2\right) = 3$, where $a, b \in N$ is :

Watch Video Solution

**3.** How many positive integers b have the property that $\log_b 729$ is a positive integer ?

Watch Video Solution

**4.** The number of negative integral values of x satisfying the inequality $\log_{\left(x+\frac{5}{2}\right)}\left(\frac{x-5}{2x-3}\right)^2 < 0$ is :

Watch Video Solution

**5.**

$\frac{6}{5}a^{(\log_a x)(\log_{10} a)(\log_a 5)} - 3^{\log_{10}\left(\frac{x}{10}\right)} = 9^{\log_{100} x + \log_4 2}(\text{where } \ a > 0, a \neq 1)$, then $\log_3 x = \alpha + \beta$, $\alpha$ is integer, $\beta \in [0, 1)$, then $\alpha =$

Watch Video Solution

**6.** If $\log_5\left(\frac{a+b}{3}\right) = \frac{\log_5 a + \log_5 b}{2}$, then $\frac{a^4+b^4}{a^2b^2} =$

Watch Video Solution

**7.** Let $a, b, c, d$ be positive integers such that $(\log)_a b = \frac{3}{2} and (\log)_c d = \frac{5}{4}\cdot$ If $(a - c) = 9,$ then find the value of $(b - d)\cdot$

Watch Video Solution

**8.** The number of real values of x satisfying the equation

$\log_{10} \sqrt{1 + x} + 3 \log_{10} \sqrt{1 - x} = 2 + \log_{10} \sqrt{1 - x^2}$ is :

Watch Video Solution

**9.** The ordered pair $(x, y)$ satisfying the equation

$x^2 = 1 + 6 \log_4 y$ and $y^2 = 2^x y + 2^{2x + 1}$

and $(x_1, y_1)$ and $(x_2, y_2)$, then find the value of $\log_2 |x_1 x_2 y_1 y_2|$.

Watch Video Solution

**10.** If

$\log_7 \log_7 \sqrt{7\sqrt{7\sqrt{7}}} = 1 - a\log_7 2 \text{ and } \log_{15}\log_{15}\sqrt{15\sqrt{15\sqrt{15\sqrt{15}}}} = 1 -$

, then $a + b =$

Watch Video Solution

**11.** The number of ordered pair(s) of (x, y) satisfying the equations

$\log_{(1+x)}(1 - 2y + y^2) + \log_{(1-y)}(1 + 2x + x^2) = 4 \text{ and } \log_{(1+x)}(1 +$

Watch Video Solution

**12.** If $\log_b(n) = 2$ and $\log_n(2b) = 2$, then b is equal to

Watch Video Solution

**13.** If $\log_y x + \log_x y = 2, x^2 + y = 12$ , then the value of xy is

Watch Video Solution

**14.** If x, y satisfy the equation, $y^x = x^y$ and $x = 2y$, then $x^2 + y^2 =$

Watch Video Solution

**15.** Find the number of real values of x satisfying the equation.

$$\log_2\left(4^{x+1} + 4\right) \cdot \log_2\left(4^x + 1\right) = \log_{1/\sqrt{2}} \sqrt{\frac{1}{8}}$$

Watch Video Solution

**16.** If $x_1, x_2(x_1 > x_2)$ are the two solutions of the equation

$3^{\log_2 x} - 12\left(x^{\log_{16} 9}\right) = \log_3\left(\frac{1}{3}\right)^{3^3}$, then the value of $x_1 - 2x_2$ is :

Watch Video Solution

**17.** Find the number or real values of x satisfying the equation $9^{2\log_9 x}+4x+3=0.$

Watch Video Solution

**18.** If $\log_{16}\left(\log_{\sqrt[4]{3}}\left(\log_{\sqrt[3]{5}}(x)\right)\right)=\frac{1}{2}$, find x.

Watch Video Solution

**19.** The value $\left[\frac{1}{6}\left(\frac{2\log_{10}(1728)}{1+\frac{1}{2}\log_{10}(0.36)+\frac{1}{3}\log_{10}8}\right)^{1/2}\right]^{-1}$ is :

Watch Video Solution