



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



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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



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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



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4. Least positive integral value of 'a' for which

$$\log_{\left(x + \frac{1}{x}\right)} (a^2 - 3a + 3) > 0, (x > 0) :$$

A. 1

B. 2

C. 3

D. 4

Answer: C



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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



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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



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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



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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



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



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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



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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



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

A. 1

B. 2

C. 7

D. 14

Answer: D



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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



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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. $\frac{\log_2 17}{\log_3 23}$

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

Answer: B



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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



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16. If P is the number of natural numbers whose logarithms to the base 10 have the characteristic p and Q is the number of natural numbers whose logarithms of whose reciprocal to the base 10 have the characteristic $-q$. 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



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17. If $2^{2010} = a_n 10^n + a_{n-1} 10^{n-1} + \dots + a_2 10^2 + a_1 \cdot 10 + a_0$,

where $a_i \in \{0, 1, 2, \dots, 9\}$ for all $i = 0, 1, 2, 3, \dots, n$, then

$n =$

A. 603

B. 604

C. 605

D. 606

Answer: C



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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

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

- A. an irrational
- B. an odd prime
- C. a composite
- D. unity

Answer: D

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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



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

A. x

B. y

C. z

D. x^x

Answer: C



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

A. 0

B. 1

C. 2

D. 3

Answer: C



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

.....

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

B. 1

C. 9

D. 8

Answer: D



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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



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25. $\sqrt{2^x \left(4^x (0.125)^{\frac{1}{x}}\right)^{\frac{1}{3}}} = 4 \cdot \left(2^{\frac{1}{3}}\right)$

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

B. 3

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

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

Answer: D



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26. Sum of all values of x satisfying the equation

$$25^{2x-x^2+1} + 9^{2x-x^2+1} = 34(15^{2x-x^2}) \text{ is:}$$

A. 1

B. 2

C. 3

D. 4

Answer: D



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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



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

A. 5

B. 25

C. 125

D. 625

Answer: C



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

A. 2

B. 4

C. 6

D. 8

Answer: B



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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 value of

$$\sum_{n=1}^{2011} f(n) \text{ is :}$$

A. 2011

B. 2011×1006

C. 6

D. 2^{2011}

Answer: C

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31. If the equation $\frac{\log_{12}(\log_8(\log_4 x))}{\log_5(\log_4(\log_y(\log_2 x)))} = 0$ 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



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

A. $(2, \infty)$

B. $(1, 2)$

C. $(-2, -1)$

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

Answer: A



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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



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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



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35. Number of real solution(s) of the equation

$$9^{\log_3(\log x)} = \ln x - (\ln x)^2 + 1 \text{ is :}$$

A. 0

B. 1

C. 2

D. 3

Answer: c



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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



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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



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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



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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



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

A. 0

B. 1

C. 27

D. 81

Answer: A



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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



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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



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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



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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



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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



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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



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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) $x_1 = x_2^2$ $2x_1 = x_2^2$ (d) $x_1^2 = x_2^3$

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



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48. Let M denote $\text{antilog}_{32} 0.6$ 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

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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

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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



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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



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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



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

A. x

B. y

C. z

D. a

Answer: C

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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

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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



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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



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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



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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



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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



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

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

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

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

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

Answer: D



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

A. 3

B. 5

C. 4

D. 6

Answer: C



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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. 2π

D. π

Answer: D



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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



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

A. 0

B. 1

C. 2

D. 3

Answer: D



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

A. 2

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

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

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

Answer: D



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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



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67. Sum of all values of x satisfying the system of equations

$$5(\log_y x + \log_x y) = 26, xy = 64 \text{ is :}$$

A. 42

B. 34

C. 32

D. 2

Answer: B



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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



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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



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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



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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



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

A. 5

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

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

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

Answer: C



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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



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74. The number of values of x satisfying the equation

$$\log_2(9^{x-1} + 7) = 2 + \log_2(3^{x-1} + 1) \text{ is :}$$

A. 1

B. 2

C. 3

D. 0

Answer: B



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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

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76. If $T_r = \frac{1}{\log_2 4^r}$ (where $r \in \mathbb{N}$), then the value of $\sum_{r=1}^4 T_r$ is :

- A. 3
- B. 4
- C. 5
- D. 10

Answer: C

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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



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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



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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



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Exercise 2 One Or More Than One Answer Is Are Correct

1. Solve the equation $\frac{1 - 2(\log x^2)^2}{\log x - 2(\log x)^2} = 1$

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

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

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

D. $\sqrt{10}$

Answer: A::C



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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



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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



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4. Let

$$A = \{x \in \mathbb{R} \mid x^2 - 2x + 7 = 0\}, x \in \mathbb{R} \text{ and } B = \{x \in \mathbb{R} \mid x^2 - 2x + 7 = 0\}, x \in \mathbb{R}$$

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



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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 α_1, α_2 and α_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



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

$\log_5 N = \alpha_2 + \beta_2$

$\log_7 N = \alpha_3 + \beta_3$

where α_1, α_2 and α_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

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 α_1, α_2 and α_3 are integers and $\beta_1, \beta_2, \beta_3 \in [0, 1)$.

Q. Difference of largest and smallest values of N if

$$\alpha_1 = 5, \alpha_2 = 3 \text{ and } \alpha_3 = 2.$$

A. 97

B. 100

C. 98

D. 99

Answer: D



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4.

If

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

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

A. ± 111

B. ± 2

C. ± 110

D. ± 109

Answer: C



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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. ± 111

B. ± 15

C. ± 2

D. ± 110

Answer: B



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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 area of ΔABC and circle circumscribing it are Δ_1 and Δ_2 respectively, then

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

A. 31

B. 28

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

D. 199

Answer: A



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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 $\triangle ABC$ and circle circumscribing it are Δ_1 and Δ_2 respectively.

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

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

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

D. 1

Answer: C



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Exercise 5 Subjective Type Problems

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



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



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

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4. The number of negative integral values of x satisfying the inequality

$$\log_{\left(x + \frac{5}{2}\right)} \left(\frac{x - 5}{2x - 3} \right)^2 < 0 \text{ is :}$$

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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 $\log_3 x = \alpha + \beta$, α is integer, $\beta \in [0, 1)$, then $\alpha =$

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



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



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

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



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

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

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



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10.

If

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

, then $a + b =$



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

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



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



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



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

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

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

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

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

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17. Find the number or real values of x satisfying the equation

$$9^{2\log_9 x} + 4x + 3 = 0.$$



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



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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 :



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