

Sample Task

Questions

Questions with Answer Keys

MathonGo

Q1

The value of x which satisfies the equation $\log_2(x^2 - 3) - \log_2(6x - 10) + 1 = 0$

Q2

Solve $\log_{10}(2^x + 1) + x = \log_{10}(6) + x \log_{10}(5)$.

(1) 4

(2) 5

(3) 2

(4) 1

Q3

$\log_{\frac{1}{3}}(x^2 + 2x) > 0$, if x belongs to the set

(1) $(-1 - \sqrt{2}, -1 + \sqrt{2})$ (2) $(-\infty, -2) \cup (0, \infty)$ (3) $(-1 - \sqrt{2}, -2) \cup (0, \sqrt{2} - 1)$

(4) None of these

Q4

If $\log_{175}(5x) = \log_{343}7x$, then the value of $\log_{42}(x^4 - 2x^2 + 7)$ is equal to

(1) 1

(2) 2

(3) 3

(4) 4

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Q5

Sum of all possible values of x which satisfy the equation $\log_3(x-3) = \log_9(x+1)$ is:

- (1) 2
- (2) 5
- (3) 7
- (4) 10

Q6

$5\sqrt{\log_5 3}$ $5\sqrt{\log_5 3}$ $5\sqrt{\log_5 3}$
 $\left| \begin{array}{ccc} 3^{-\log_{1/3}(4)} & (0.1)^{\log_{0.01}(4)} & 7^{\log_7(3)} \\ 7 & 3 & 5 \end{array} \right|$ is equal to

- (1) 0
- (2) $5\sqrt{\log_5 3}$
- (3) $2 \cdot 5\sqrt{\log_5 3}$
- (4) None of these

Q7

The set of all solutions of the equation $\log_3 x \log_4 x \log_5 x = \log_3 x \log_4 x + \log_4 x \log_5 x + \log_5 x \log_3 x$ is

- (1) $\{1\}$
- (2) $\{1, 60\}$
- (3) $\{1, 5, 10, 60\}$
- (4) $\{1, 4, 8, 60\}$

Q8

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If $n > 1$, the value of $\frac{1}{\log_2 n} + \frac{1}{\log_3 n} + \dots + \frac{1}{\log_{53} n}$ is

(1) $\frac{1}{\log_{53!} n}$

(2) 1

(3) $\frac{1}{\log_{n!} 53}$

(4) $\frac{1}{53}$

Q9

The solution of the equation $4^{\log_2 \log x} = \log x - (\log x)^2 + 1$ is

(1) $x = 1$

(2) $x = 4$

(3) $x = e$

(4) $x = e^2$

Q10

Suppose $x, y, z > 0$ and distinct and $\ln x + \ln y + \ln z = 0$, if the value of $x^{\frac{1}{\ln y} + \frac{1}{\ln z}} \cdot y^{\frac{1}{\ln z} + \frac{1}{\ln x}} \cdot z^{\frac{1}{\ln x} + \frac{1}{\ln y}}$ is e^{-k} , then $k =$

Q11

The solution set of $\log_{|\sin x|} (x^2 - 8x + 23) > \frac{3}{\log_2 |\sin x|}$ contains

(1) $x \in (3, \pi) \cup \left(\pi, \frac{3\pi}{2}\right) \cup \left(\frac{3\pi}{2}, 5\right)$

(2) $x \in (3, \pi) \cup (\pi, 5)$

(3) $x \in \left(3, \frac{5\pi}{2}\right)$

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(4) $x \in (2, 5\pi/2)$

Q12

The set of all x satisfying the equation $x^{\log_3 x^2 + (\log_3 x)^2 - 10} = 1/x^2$ is

(1) $\{1, 9\}$

(2) $\{1, 9, 1/81\}$

(3) $\{1, 4, 1/81\}$

(4) $\{9, 1/81\}$

Q13

Consider the value of x which satisfies the following relation:

$$\frac{6}{5} a^{\log_{11} x \cdot \log_{10} a \cdot \log_{10} 5} = 3^{\log_{10} \frac{x}{10}} + 9^{\log_{100} x + \log_4 2}$$

This value of x lies between:

(1) 10 and 20

(2) 30 and 40

(3) 75 and 85

(4) 95 and 105

Q14

Solution set of the inequality

$$\log_x(2x^2 + x - 1) > \log_x(2) - 1$$

is

(1) $(1/2, 1)$

(2) $(1/2, 1) \cup (1, \infty)$

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(3) $(1, \infty)$

(4) $(0, 1)$

Q15

Consider the equation $\log_{\sqrt{2}\sin x} \left(1 + \cos x \right) = 2, x \in \left[-\frac{\pi}{2}, \frac{3\pi}{2} \right]$ If the sum of the roots is $\frac{p\pi}{q}$, where

$GCD(p, q) = 1$, then evaluate $p^2 + q^2$.

Q16

Solve the inequality

$$\frac{(x-2)^{10000}(x+1)^{253} \left(x - \frac{1}{2}\right)^{971} (x+8)^4}{x^{500}(x-3)^{75}(x+2)^{93}} \geq 0$$

(1) $(-\infty, -2) \cup (-1, 0) \cup \left(0, \frac{1}{2}\right] \cup (3, \infty)$

(2) $(-\infty, -2) \cup [-1, 0) \cup \left(0, \frac{1}{2}\right] \cup (3, \infty)$

(3) $(-\infty, -1] \cup \left(0, \frac{1}{2}\right] \cup (3, \infty)$

(4) None of these

Q17

Let $f(x) = \frac{(x-3)(x+2)(x+6)}{(x+1)(x-5)}$ Find where $f(x)$ is negative.

(1) $(-\infty, -6) \cup (-2, -1) \cup (3, 5)$

(2) $(-\infty, -2) \cup (-1, 3) \cup (5, \infty)$

(3) $(-\infty, -6] \cup (3, \infty)$

(4) $(-\infty, -2) \cup (-1, 5)$

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Q18

Solve the equation $\left| \frac{x^2 - 8x + 12}{x^2 - 10x + 21} \right| = -\frac{x^2 - 8x + 12}{x^2 - 10x + 21}$

(1) $[2, 3) \cup [6, 7]$

(2) $[2, 3] \cup [6, 7)$

(3) $[2, 3) \cup [4, 8)$

(4) $[2, 3) \cup [6, 7)$

Q19

Solve the inequality $(x + 3)(3x - 2)^5(7 - x)^3(5x + 8)^2 \geq 0$

(1) $(-\infty, -3) \cup \left[\frac{2}{3}, 7\right) \cup \left(\frac{-8}{5}\right)$

(2) $(-\infty, -3] \cup \left[\frac{2}{3}, 7\right] \cup \left\{-\frac{8}{5}\right\}$

(3) $\left(-\infty, \frac{2}{3}\right] \cup [7, \infty)$

(4) None of these

Q20

Find the number of integral values of x satisfying the inequation: $\frac{x}{x+2} \leq \frac{1}{|x|}$.

Q21

Solve the inequation $\sqrt{-x^2 + 4x - 3} > 6 - 2x$

(1) $\left(\frac{12}{7}, 4\right)$

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(2) $\left(\frac{13}{5}, 4\right)$

(3) $\left(\frac{13}{5}, 3\right)$

(4) $\left(\frac{12}{7}, 3\right)$

Q22

Let $[a]$ denotes the larger integer not exceeding the real number a . If x and y satisfy the equations $y = 2[x] + 3$ and $y = 3[x - 2]$ simultaneously, determine $[x + y]$

Q23

If $\{x\}$ and $[x]$ represent fractional and integral part of x respectively, find the value of $[x] + \sum_{r=1}^{2000} \frac{\{x+r\}}{2000}$

(1) x

(2) $x + \{x\}$

(3) $x + [x]$

(4) $2x + [x]$

Q24

Solve the equation $|x - |4 - x|| - 2x = 4$

(1) Two solutions

(2) Three solutions

(3) One solution

(4) No solution

Q25

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The number of solution(s) the equation $|x - 1| + |x - 2| + |x - 3| + |x - 4| = 3$ is

- (1) 2
- (2) 1
- (3) 0
- (4) 4

Q26

Find the set of all x for which $\frac{2x}{(2x^2 + 5x + 2)} > \frac{1}{(x+1)}$

- (1) $\left(-2, -\frac{2}{3}\right) \cup \left(-\frac{1}{2}, \infty\right)$
- (2) $(-\infty, -2) \cup \left(-2, -\frac{2}{3}\right)$
- (3) $(-2, -1) \cup \left(-\frac{2}{3}, -\frac{1}{2}\right)$
- (4) $\left(-2, -\frac{2}{3}\right) \cup \left(-\frac{1}{2}, 0\right)$

Q27

Number of integral values of x satisfying the inequation $\frac{(x^2 - 2x + 8)(e^x + 2)(x - 3)(x - 8)}{(\log_2(x^2 + 3))(x - 5)^2} \leq 0$ are

Q28

Solution set of equation $\left|1 - \log_{\frac{1}{6}} x\right| + \left|\log_2 x\right| + 2 = \left|3 - \log_{\frac{1}{6}} x + \log_{\frac{1}{2}} x\right|$ is $\left[\frac{a}{b}, a\right]$, $a, b \in \mathbb{N}$, then the value of $\frac{(a+b)}{2}$ is

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(1) 5

(2) 6

(3) 7

(4) 8

Q29

Solve the inequation $\left| 1 - \frac{|x|}{1+|x|} \right| \geq \frac{1}{2}$.

(1) $[-1, 0]$ (2) $[0, 1]$ (3) $[-1, 1]$ (4) $[-\infty, -1]$

Q30

Find the number of solution of the equation $[2x] - [x + 1] = 2x$ where $[\cdot]$ represent the greatest integer function.

(1) 2

(2) 3

(3) 1

(4) More than 3

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Q1 (2)	Q2 (4)	Q3 (3)	Q4 (1)
Q5 (2)	Q6 (1)	Q7 (2)	Q8 (1)
Q9 (3)	Q10 (3)	Q11 (1)	Q12 (2)
Q13 (4)	Q14 (2)	Q15 (10)	Q16 (4)
Q17 (1)	Q18 (4)	Q19 (2)	Q20 (4)
Q21 (3)	Q22 (30)	Q23 (1)	Q24 (3)
Q25 (3)	Q26 (3)	Q27 (5)	Q28 (3)
Q29 (3)	Q30 (1)		