

DPP No. 1

SYLLABUS : FUNDAMENTALS OF MATHEMATICS

1. Number of integer values of x satisfying $-5 \leq x < 10$ and $0 \leq x \leq 15$ is
(A) 10 (B) 11 (C) 12 (D) 13
2. The number of positive integers satisfying the inequality $\frac{x^2 - 1}{2x + 5} < 3$ is
(A) 10 (B) 9 (C) 8 (D) 7
3. The complete set of values of ' x ' which satisfy the inequations : $5x + 2 < 3x + 8$ and $\frac{x + 2}{x - 1} < 4$ is
(A) $(-\infty, 1)$ (B) $(2, 3)$ (C) $(-\infty, 3)$ (D) $(-\infty, 1) \cup (2, 3)$
4. The number of the integral solutions of $x^2 + 9 < (x + 3)^2 < 8x + 25$ is :
(A) 1 (B) 2 (C) 3 (D) none of these
5. The complete solution set of the inequality $\frac{x^4 - 3x^3 + 2x^2}{x^2 - x - 30} \geq 0$ is:
(A) $(-\infty, -5) \cup (1, 2) \cup (6, \infty) \cup \{0\}$ (B) $(-\infty, -5) \cup [1, 2] \cup (6, \infty) \cup \{0\}$
(C) $(-\infty, -5] \cup [1, 2] \cup [6, \infty) \cup \{0\}$ (D) none of these
6. Number of positive integral values of x satisfying the inequality
$$\frac{(x - 4)^{2013} \cdot (x + 8)^{2014} (x + 1)}{x^{2016} (x - 2)^3 \cdot (x + 3)^5 \cdot (x - 6) (x + 9)^{2012}} \leq 0$$
 is
(A) 0 (B) 1 (C) 2 (D) 3
7. The number of real roots of the equation $|x|^2 - 3|x| + 2 = 0$ is :
(A) 1 (B) 2 (C) 3 (D) 4
8. The minimum value of $f(x) = |x - 1| + |x - 2| + |x - 3|$ is equal to
(A) 1 (B) 2 (C) 3 (D) 0
9. Solution of $|4x + 3| + |3x - 4| = 12$ is
(A) $x = -\frac{7}{3}, \frac{3}{7}$ (B) $x = -\frac{5}{2}, \frac{2}{5}$ (C) $x = -\frac{11}{7}, \frac{13}{7}$ (D) $x = -\frac{3}{7}, \frac{7}{5}$
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10. If $||x - 1| - 5| = 2$, then number of distinct values of x is
 (A) 1 (B) 2 (C) 3 (D) 4
11. Solve for $x \in \mathbb{R}$ $|x^2 - x - 6| = x + 2$.
 (A) $x \in \{2, 4\}$ (B) $x \in \{-2, 4\}$ (C) $x \in \{-2, 2\}$ (D) $x \in \{-2, 2, 4\}$
12. If $||x - 3| - 4| = 1$ the sum of values of x is
 (A) 3 (B) 6 (C) 9 (D) 12
13. Sum of the solutions of the equations $x^2 - 5|x| - 4 = 0$ is
 (A) 8 (B) 2 (C) 10 (D) 0
14. The complete set of real 'x' satisfying $||x - 1| - 1| \leq 1$ is :
 (A) $[0, 2]$ (B) $[-1, 3]$ (C) $[-1, 1]$ (D) $[1, 3]$
15. Solution set of the inequalities $|x^2 + x - 2| \leq 0$ and $|x^2 - x + 2| \geq 0$ is
 (A) $x \in [-2, 1]$ (B) $[-2, -1]$ (C) $\{-2, 1\}$ (D) $\{-2, -1, 1, 2\}$
16. If $a^4 \cdot b^5 = 1$ then the value of $\log_a(a^5 b^4)$ equals
 (A) $9/5$ (B) 4 (C) 5 (D) $8/5$
17. $\frac{1}{1+\log_b a + \log_b c} + \frac{1}{1+\log_c a + \log_c b} + \frac{1}{1+\log_a b + \log_a c}$ has the value equal to
 (A) abc (B) $\frac{1}{abc}$ (C) 0 (D) 1
18. $\frac{1}{\log_{\sqrt{bc}} abc} + \frac{1}{\log_{\sqrt{ca}} abc} + \frac{1}{\log_{\sqrt{ab}} abc}$ has the value equal to :
 (A) $1/2$ (B) 1 (C) 2 (D) 4
19. Which one of the following is the smallest?
 (A) $\log_{10} \pi$ (B) $\sqrt{\log_{10} \pi^2}$ (C) $\left(\frac{1}{\log_{10} \pi}\right)^3$ (D) $\left(\frac{1}{\log_{10} \sqrt{\pi}}\right)$
20. $\log_{10}(\log_2 3) + \log_{10}(\log_3 4) + \log_{10}(\log_4 5) + \dots + \log_{10}(\log_{1023} 1024)$ simplifies to
 (A) a composite (B) a prime number
 (C) rational which is not an integer (D) an integer
21. The solution set of the inequality $\log_{\sin\left(\frac{\pi}{3}\right)}(x^2 - 3x + 2) \geq 2$ is
 (A) $\left(\frac{1}{2}, 2\right)$ (B) $\left(1, \frac{5}{2}\right)$ (C) $\left[\frac{1}{2}, 1\right) \cup \left(2, \frac{5}{2}\right]$ (D) None of these
22. If $\log_{0.3}(x - 1) < \log_{0.09}(x - 1)$, then x lies in the interval
 (A) $(2, \infty)$ (B) $(1, 2)$ (C) $(-2, -1)$ (D) none of these
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23. Solution set of the inequality $2 - \log_2 (x^2 + 3x) \geq 0$ is :
 (A) $[-4, 1]$ (B) $[-4, -3) \cup (0, 1]$
 (C) $(-\infty, -3) \cup (1, \infty)$ (D) $(-\infty, -4) \cup [1, \infty)$
24. If $x, |x + 1|, |x - 1|$ are three terms of an A.P., then number of possible values of x is –
 (A) 1 (B) 2 (C) 3 (D) 4
25. Number of real solution(s) of the equation $|x - 3|^{3x^2 - 10x + 3} = 1$ is :
 (A) exactly four (B) exactly three (C) exactly two (D) exactly one

ANSWER KEY OF DPP NO. : 01

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| 1. (A) | 2. (D) | 3. (D) | 4. (D) | 5. (B) |
| 6. (D) | 7. (B) | 8. (B) | 9. (C) | 10. (D) |
| 11. (D) | 12. (D) | 13. (D) | 14. (B) | 15. (C) |
| 16. (A) | 17. (D) | 18. (B) | 19. (A) | 20. (D) |
| 21. (C) | 22. (A) | 23. (B) | 24. (B) | 25. (B) |