



RAMAGYA SCHOOL, NOIDA
XI/MATHEMATICS/2017-18
OLYMPIAD PRACTICE WORKSHEET

(Concept based)

1. If $n_{C_{12}} = n_{C_8}$, then n is equal to
(A) 20 (B) 12 (C) 6 (D) 30
2. What is the perpendicular distance of the point P (6, 7, 8) from xy-plane?
(A) 8 (B) 7 (C) 6 (D) None of these
3. $\lim_{x \rightarrow 0} \frac{\tan 2x - x}{3x - \sin x}$ is
(A) 2 (B) 1/2 (C) -1/2 (D) 1/4
4. If the coefficients of x^7 and x^8 in $(2 + \frac{x}{3})^n$ are equal, then n is
(A) 56 (B) 55 (C) 45 (D) 15
5. The number of ways in which we can choose a committee from four men and six women so that the committee includes at least two men and exactly twice as many women as men is
(A) 94 (B) 126 (C) 128 (D) None
6. Seven persons are to be seated in a row. The probability that two particular persons sit next to each other is
(A) 1/3 (B) 1/6 (C) 2/7 (D) 1/2

(Application based)

7. If $y = \frac{\sin(x+9)}{\cos x}$ then dy/dx at $x = 0$ is
(A) $\cos 9$ (B) $\sin 9$ (C) 0 (D) 1
8. Dinesh started answering a test at a time between 3 pm and 4 pm. He noted the position of the hands of his watch. He ended the test at a time between 4 pm and 5 pm. The position of the hands were interchanged. For how many hours did the test last?
(a) $\frac{13}{14}$ (b) $\frac{12}{13}$ (c) $\frac{9}{10}$ (d) $\frac{10}{11}$
9. 50 men or 80 women can finish a job in 50 days. A contractor deploys 40 men and 48 women for this work, but after every duration of 10 days, 5 men and 8 women are removed till the work is completed. The work is completed in?
(a) 45 days (b) 50 days (c) 54 days (d) 62 days
10. The number of terms in the expansion of $(a + b + c)^n$, where $n \in \mathbb{N}$ is

- (A) $\frac{(n+1)(n+2)}{2}$ (B) $n + 1$ (C) $n + 2$ (D) $(n + 1)n$

11. If a parallelepiped is formed by planes drawn through the points (5, 8, 10) and (3, 6, 8) parallel to the coordinate planes, then the length of diagonal of the parallelepiped is

- (A) $2\sqrt{3}$ (B) $3\sqrt{2}$ (C) $\sqrt{2}$ (D) $\sqrt{3}$

12. The length of the straight line $x - 3y = 1$ intercepted by the hyperbola $x^2 - 4y^2 = 1$ is

- (a) $\frac{6}{\sqrt{5}}$ (b) $3\sqrt{\frac{2}{5}}$ (c) $6\sqrt{\frac{2}{5}}$ (d) none of these

(HOTS)

13. $\lim_{x \rightarrow \pi/4} \frac{\sec^2 x - 2}{\tan x - 1}$ is

- (A) 3 (B) 1 (C) 0 (D) $\sqrt{2}$

14. $\lim_{x \rightarrow 0} \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}$

- (A) $-1/4$ (B) $1/2$ (C) 1 (D) 2

15. $\lim_{x \rightarrow 1} [x - 1]$, where $[.]$ is greatest integer function, is equal to

- (A) 1 (B) 2 (C) 0 (D) does not exist

16. The locus of the point of intersection of the lines $\sqrt{3}x - y - 4\sqrt{3}\alpha = 0$ and $\sqrt{3}ax + \alpha y - 4\sqrt{3} = 0$ is a hyperbola of eccentricity

- (a) 1 (b) 2 (c) 3 (d) 4

17. If the coordinates of the middle point of the portion of a line intercepted between the coordinate axes is (3, 2), then the equation of the line will be

- (A) $2x + 3y = 12$ (B) $3x + 2y = 12$ (C) $4x - 3y = 6$ (D) $5x - 2y = 10$

18. $\lim_{x \rightarrow 0} \frac{\sqrt{4+x} - \sqrt[3]{8+3x}}{x}$ is

- (A) $-1/2$ (B) $1/2$ (C) -3 (D) 0

(Value based)

19. The value of α for which the lines $3x + 4y = 5$, $5x + 4y = 4$ and $ax + 4y = 6$ meet at a point is

- (a) 2 (b) 1 (c) 4 (d) 3

20. A point moves in a plane so that its distances PA and PB from two fixed points A and B in the plane satisfy the relation $PA - PB = K$ ($K \neq 0$), then the locus of point P is

- (a) a parabola (b) a hyperbola (c) an ellipse (d) a branch of the hyperbola