

1. Rohit is riding his bicycle at 12 km/h. The number of metres he travels each minute is
 A. 20 B. 200 C. 400 D. 12000
2. Ten friends are exchanging gifts for Christmas. If each friend gives one gift to everyone else, how many gifts were exchanged in total?
 A. 10 B. 45 C. 90 D. 100
3. $\sqrt{-4} + \sqrt{-9}$ equals
 A. $\sqrt{-13}$ B. $13i$ C. $5i$ D. 5
4. $\frac{1}{i}$ equals
 A. $-i$ B. i C. -2 D. $\pm i$
5. The conjugate of $z = 3$ is
 A. -3 B. 3 C. $-3i$ D. 0
6. Successive discounts of 10%, 20% and 50% are equivalent to a single discount of
 A. 36% B. 26.67% C. 64% D. 80%
7. What are the coordinates of a point which lies on the line $x - 2 = y - 3 = 2z - 4$?
 A. (2, 3, 2) B. (2, 3, 4) C. (2, 0, 0) D. (0, 0, 0)
8. A directional vector of the line $3 - x = y - 2 = z - 1$ is
 A. $-i + j + k$ B. $3i + 2j + k$ C. $i - j + k$ D. $i - 2j + k$
9. Given $P_1 = (-5, -1, 8)$ and $P_2 = (-4, 0, 9)$, the vector $\overrightarrow{P_1P_2}$ is
 A. $i + j + k$ B. $3i + 2j + k$ C. $i - j + k$ D. $i - 2j + k$
10. The length of $2i + j + 2k$ is
 A. $\sqrt{5}$ B. 3 C. 7 D. 9
11. Which of the following sequence diverges?
 A. $\langle n^{-1} \rangle$ B. $\langle 2 + \frac{1}{n} \rangle$ C. $\langle 2n^{-2} \rangle$ D. $\langle 2n \rangle$

12. $f(x) = x^2$ and $g(x) = \sqrt{x}$. The domain of $f \circ g(x)$ is
 A. $x < 0$ B. $x > 0$ C. $x \geq 0$ D. $x \leq 0$
13. The point of inflection of $y = (x - 1)^3(x - 3)^2$ which lies on the x -axis is at
 A. $(0, 0)$ B. $(1, 0)$ C. $(2, 0)$ D. $(3, 0)$
14. The coordinates of the y -intercept of $y = x(x + 3)^2(x - 6)^3$ are
 A. $(0, 0)$ B. $(0, 1)$ C. $(0, 18)$ D. $(3, 6)$
15. How many solutions exist for $\sin \theta (2\sin \theta - 1) = 0$?
 A. 2 B. 3 C. 5 D. infinite
16. What is the minimum value of $y = 3\sin x + 4\cos x$?
 A. 1 B. 7 C. -5 D. -7
17. The range of $y = \cos x + 1$ is
 A. $0 \leq y \leq 1$ B. $0 \leq y \leq 2$ C. $1 \leq y \leq 2$ D. R
18. A and B are independent events. If $P(A) = 20\%$ and $P(B) = 50\%$, $P(A \cap B) =$
 A. 0 B. 0.1 C. 0.7 D. 1
19. It is found that 75% of the patients suffering from a particular disease are cured successfully. What is the probability that 3 out of next 4 patients will be cured successfully?
 A. $\binom{4}{3} (0.75)^1 (0.25)^3$ B. $\binom{4}{3} (0.75)^3 (0.25)^1$ C. $(0.75)^3 (0.25)^1$ D. 1
20. How many terms are there in the binomial expansion of $(8x + 7y)^{19}$?
 A. 15 B. 19 C. 20 D. 34
21. Which of the following line represents an asymptote of $y = \frac{x^2 - 4}{x^2 - 1}$?
 A. $y = 0$ B. $y = 1$ C. $x = 0$ D. $y = x$

22. Which function has an oblique asymptote?

- A. balanced B. bottom-heavy C. top-heavy D. absolute value

23. For the function $y = x^2 + 3$, $\frac{dy}{dx}$ equals

- A. $2x$ B. $2x + 3$ C. 3 D. $x^3 + 3x$

24. $\int_0^5 2x =$

- A. 0 B. 5 C. 10 D. 25

25. What is the value of $\lim_{x \rightarrow -2} \frac{x^2 - 4}{x + 2}$?

- A. -4 B. -3 C. -2 D. does not exist

26. $\frac{3x + 11}{x^2 - x - 6}$ when expressed in partial fractions where A and B are constants is

- A. $\frac{A}{x-3} + \frac{B}{x+2}$ B. $\frac{A}{3x} + \frac{B}{x^2}$ C. $\frac{A}{x^2-x} + \frac{B}{-6}$ D. $\frac{A}{3x+11} + \frac{B}{x+2}$

27. $\sin 60^\circ + \cos 30^\circ =$

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

28. The value of $2^{2025} + 2^{2025}$ is

- A. 2^{2025} B. 2^{4050} C. 4^{1013} D. 4^{4050}

29. The cost of feeding 4 dogs for 10 days is \$200. What would be the cost of feeding 5 dogs for 5 days?

- A. \$25 B. \$100 C. \$120 D. \$125

30. A joiner makes m doors per week. The production is increased by $n\%$. The number of doors made per week is now

- A. $m + n$ B. $m + \frac{n}{100}$ C. $\frac{mn}{100}$ D. $m(1 + \frac{n}{100})$