

1. If $\text{Log}_x (1/8) = -3/2$, then x is equal to

- (a) -4
- (b) 4
- (c) $1/4$
- (d) 10

2. 20 % of 2 is equal to

- (a) 20
- (b) 4
- (c) 0.4
- (d) 0.04

3. When a parabola represented by the equation $y - 2x^2 = 8x + 5$ is translated 3 units to the left and 2 units up, the new parabola has its vertex at

- (a) (-5, -1)
- (b) (-5, -5)
- (c) (-1, -3)
- (d) (-2, -3)

4. The graphs of the two linear equations $ax + by = c$ and $bx - ay = c$, where a , b and c are all not equal to zero,

- (a) are parallel
- (b) intersect at one point
- (c) intersect at two points
- (d) perpendicular

5. For x greater than or equal to zero and less than or equal to 2π , $\sin x$ and $\cos x$ are both decreasing on the intervals

- (a) $(0, \pi/2)$
- (b) $(\pi/2, \pi)$
- (c) $(\pi, 3\pi/2)$
- (d) $(3\pi/2, 2\pi)$

6. A school committee consists of 2 teachers and 4 students. The number of different committees that can be formed from 5 teachers and 10 students is

- (a) 10
- (b) 15
- (c) 2100
- (d) 8

7. The exam scores of all 500 students were recorded and it was determined that these scores were normally distributed. If Jane's score is 0.8 standard deviation above the mean, then how many, to the nearest unit, students scored above Jane?

- (a) 394
- (b) 250
- (c) 400
- (d) 106

8. If $f(x)$ is an odd function, then $|f(x)|$ is

- (a) an odd function
- (b) an even function
- (c) neither odd nor even
- (d) even and odd

9. The period of $|\sin(3x)|$ is

- (a) 2π
- (b) $2\pi/3$
- (c) $\pi/3$
- (d) 3π

10. The period of $2 \sin x \cos x$ is

- (a) $4\pi^2$
- (b) 2π
- (c) 4π
- (d) π

11. Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house is

- (a) $5/9$
- (b) $1/9$
- (c) $8/9$
- (d) $4/9$

12. A lizard, at an initial distance of 21 cm behind an insect, moves from rest with an acceleration of 2 cm/s^2 and pursues the insect which is crawling uniformly along a straight line at a speed of 20 cm/s . Then the lizard will catch the insect after

- (a) 19 s
- (b) 1 s
- (c) 21 s
- (d) 25 s

13. If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5, then k lies in the interval
Here 2 read as Square

- (a) $(5, 6]$
- (b) $(6, \infty)$
- (c) $(-\infty, 4)$
- (d) $[4, 5]$

14. A plane passes through $(1, -2, 1)$ and is perpendicular to two planes $2x - 2y + z = 0$ and $x - y + 2z = 4$. The distance of the plane from the point $(1, 2, 2)$ is

- (a) 0
- (b) 2
- (c) Square Root of 3
- (d) 2 Square Root of 2

15. A tangent drawn to the curve $y = f(x)$ at $P(x, y)$ cuts the x -axis and y -axis at A and B respectively such that $BP : AP = 3 : 1$, given that $f(1) = 1$, then

- (a) equation of curve is $x \frac{dy}{dx} - 3y = 0$
- (b) normal at $(1, 1)$ is $x + 3y = 4$
- (c) curve passes through $(2, 1/8)$
- (d) equation of curve is $x \frac{dy}{dx} + 3y = 0$

16. Suppose a population A has 100 observations $101, 102, \dots, 200$, and another population B has 100 observations $151, 152, \dots, 250$. If V_A and V_B represent the variances of the two populations, respectively, then V_A/V_B is

- (a) 1
- (b) $9/4$
- (c) $4/9$
- (d) $2/3$

17. The number of values of x in the interval $[0, 3\pi]$ satisfying the equation $2\sin 2x + 5\sin x - 3 = 0$ is
- (a) 4
 - (b) 6
 - (c) 1
 - (d) 2

18. Let W denote the words in the English dictionary. Define the relation R by : $R = \{(x, y) \in W \times W \mid \text{the words } x \text{ and } y \text{ have at least one letter in common}\}$. Then R is
- (a) not reflexive, symmetric and transitive
 - (b) reflexive, symmetric and not transitive
 - (c) reflexive, symmetric and transitive
 - (d) reflexive, not symmetric and transitive

19. A particle has two velocities of equal magnitude inclined to each other at an angle θ . If one of them is halved, the angle between the other and the original resultant velocity is bisected by the new resultant. Then θ is
- (a) 90°
 - (b) 120°
 - (c) 45°
 - (d) 60°

20. A body falling from rest under gravity passes a certain point P . It was at a distance of 400 m from P , 4s prior to passing through P . If $g = 10 \text{ m/s}^2$, then the height above the point P from where the body began to fall is
- (a) 720 m
 - (b) 900 m
 - (c) 320 m
 - (d) 680 m

ANSWER KEY

1b

2c

3a

4d

5b

6c

7d

8b

9c

10d

11b

12c

13c

14d

15c

16a

17a

18b

19b

20a