1. A line passes through (2,2) and cuts a triangle of area 9 square units from the first quadrant. The sum of all possible values for the slope of such a line, is

(A) –2.5 (B) –2 (C) –1.5 (D) –1

2. The equations of L_1 and L_2 are y = mx and y = nx, respectively. Suppose L_1 makes twice as large of an angle with the horizontal (measured counterclockwise from the positive x-axis) as does L_2 and that L_1 has 4 times the slope of L_2. If L_1 is not horizontal, then the value of the product (mn) equals-

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

3. The extremities of the base of an isosceles triangle ABC are the points A(2,0) and B(0,1). If the equation of the side AC is x = 2 then the slope of the side BC is -

(A) $\frac{3}{4}$ (B) $\frac{4}{3}$ (C) $\frac{3}{2}$ (D) $\sqrt{3}$

4. The graph of the function, $y = \cos x \cos(x + 2) - \cos^2(x + 1)$ is -

(A) a straight line passing through $(0,-\sin^2 1)$ with slope 2

(B) a straight line passing through (0,0)

(C) a parabola with vertex $(1,-\sin^2 1)$

(D) a straight line passing through the point $\left(\frac{\pi}{2}, -\sin^2 1\right)$ and parallel to the x-axis.

5. The sides of a triangle ABC lie on the lines 3x + 4y = 0; 4x + 3y = 0 and x = 3. Let (h,k) be the centre of the circle inscribed in ΔABC. The value of (h + k) equals-

(A) 0 (B) 1/4 (C) –1/4 (D) 1/2

6. If m and b are real numbers and mb > 0, then the line whose equation is y = mx + b cannot contain the point-

(A) (0,2009) (B) (2009,0) (C) (0,–2009) (D) (20,–100)

7. The co-ordinates of the orthocentre of the triangle bounded by the lines, 4x – 7y + 10 = 0; x + y = 5 and 7x + 4y = 15 is-

(A) (2,1) (B) (–1,2) (C) (1,2) (D) (1,–2)

8. If the x intercept of the line y = mx + 2 is greater than 1/2 then the gradient of the line lies in the interval-

(A) (–1,0) (B) (–1/4,0) (C) $(-\infty,-4)$ (D) (–4,0)

9. Let the co-ordinates of the points A and B be (1,2) and (7,5) respectively. The line AB is rotated through 45° in anti clockwise direction about the point of trisection of AB which is nearer to B. The equation of the line in new position is :

(A) 2x – y – 6 = 0 (B) x – y – 1 = 0 (C) 3x – y – 11 = 0 (D) none of these

10. The greatest slope along the graph represented by the equation $4x^2 - y^2 + 2y - 1 = 0$, is-

(A) –3 (B) –2 (C) 2 (D) 3

11. A ray of light passing through the point A(1,2) is reflected at a point B on the x-axis and then passes through (5,3). Then the equation of AB is :

(A) 5x – 4y = 13 (B) 5x – 4y = –3 (C) 4x + 5y = 14 (D) 5x – 4y = 13

12. In a triangle ABC, side AB has the equation $2x + 3y = 29$ and the side AC has the equation, $x + 2y = 16$. If the mid- point of BC is (5,6) then the equation of BC is :

(A) $x - y = -1$ (B) $5x - 2y = 13$ (C) $x + y = 11$ (D) $3x - 4y = -9$

13. Number of lines that can be drawn through the point(4,–5) so that its distance from (–2,3) will be equal to 12 is equal to

(A) 0 (B) 1 (C) 2 (D) 3

14. Two mutually perpendicular straight lines through the origin form an isosceles triangle with the line $2x + y = 5$. Then the area of the triangle is :

(A) 5 (B) 3 (C) 5/2 (D) 1

15. Let the lines $(y - 2) = m_1(x - 5)$ and $(y + 4) = m_2(x - 3)$ intersect at right angles at P (where m_1 and m_2 are parameters). If locus of P is $x^2 + y^2 + gx + fy + 7 = 0$, then $(f - g)$ equals -

(A) 1 (B) 2 (C) 8 (D) 10

16. P lies on the line $y = x$ and Q lies on $y = 2x$. The equation for the locus of the mid point of PQ, if $|PQ| = 4$, is

(A) $25x^2 + 36xy + 13y^2 = 4$ (B) $25x^2 - 36xy + 13y^2 = 4$

(C) $25x^2 - 36xy - 13y^2 = 4$ (D) $25x^2 + 36xy - 13y^2 = 4$

17. The vertex of the right angle of a right angled triangle lies on the straight line $2x - y - 10 = 0$ and the two other vertices, at points (2,–3) and (4,1) then the area of triangle in sq. units is-

(A) $\sqrt{10}$ (B) 3 (C) $\frac{33}{5}$ (D) 11

18. The area of triangle ABC is 20 square units. The co-ordinates of vertex A are (–5,0) and B are (3,0). The vertex C lies on the line, $x - y = 2$. The co-ordinates of C are -

(A) (5,3) (B) (–3,–5) (C) (–5,–7) (D) (7,5)

[SUBJECTIVE]

19. (a) Find the equation of the straight line passing through (3,4) and the intersecting point of the two lines $5x - y = 9$ and $x + 6y = 8$.

(b) Find the equation of the straight line which go through the origin and trisect the portion of the straight line $3x + y = 12$ which is intercepted between the axes of coordinates.

(c) Find the equations to the straight line which passes through the point(–5,4) and is such that the portion of it between the axes is divided by the point in the ratio of 1 : 2.

20. Find the equation to the straight line which passes through the point (5,6) and has intercepts on the axes.

(i) Equal in magnitude and both positive.

(ii) Equal in magnitude but opposite in sign.

[MATCH THE COLUMN]

21. Consider the line $Ax + By + C = 0$.

Match the nature of intercept of the line given in column-I with their corresponding conditions in column-II. The mapping is one to one only.

	Column-I		**Column-II**
(A)	x intercept is finite and y intercept is infinite	(P)	$A = 0, B, C \neq 0$
(B)	x intercept is infinite and y intercept is finite	(Q)	$C = 0, A, B \neq 0$
(C)	both x and y intercepts are zero	(R)	$A,B = 0$ and $C \neq 0$
(D)	both x and y intercepts are infinite	(S)	$B = 0, A,C \neq 0$

Answers

1. (A) **2.** (C) **3.** (A) **4.** (D) **5.** (A) **6.** (B) **7.** (C) **8.** (D) **9.** (C) **10.** (C)
11. (A) **12.** (C) **13.** (A) **14.** (A) **15.** (D) **16.** (B) **17.** (B) **18.** (BD)
19. (a) $3x - y - 5 = 0$, (b) $y = 6x$, $2y = 3x$, (c) $5y - 8x = 60$ **20.** (i) $x + y = 11$, (ii) $y - x = 1$
21. A-S ; B-P ; C-Q ; D-R