UNIT-4 STRAIGHT LINES

SUCCESS TIP: FEW WEAK CHAPTERS DOESNOT MEAN WHOLE SUBJECT IS WEAK

1. If a point P moves such that the sum of its distances from two perpendicular lines is less than or equal to 2 and S be the region consisting of all such points P, then area of the region S is

(a) 4 sq. units (b) 8 sq. units

(c) 6 sq. units (d) none of these

2. If $\frac{2}{\lfloor 1 \rfloor 9}+\frac{2}{\lfloor 3 \rfloor 7}+\frac{1}{\lfloor 5 \rfloor 5}=\frac{2^m}{\lfloor n}$, then orthocentre of the triangle having sides $x - y + 1 = 0$, $x + y + 3 = 0$ and $2x + 5y - 2 = 0$ is

(a) $(2m - 2n, m - n)$ (b) $(2m - 2n, n - m)$

(c) $(2m - n, n + m)$ (d) none of these

3. The equation of the line bisecting the obtuse angle between $y - x = 2$ and $2y + x = 5$ is

(a) $\frac{y-x-2}{\sqrt{2}}=\frac{2y-x-5}{\sqrt{5}}$ (b) $\frac{y-x-2}{\sqrt{2}}=\frac{-2y-x+5}{\sqrt{5}}$

(c) $\frac{y-x-2}{\sqrt{2}}=\frac{2y+x-5}{\sqrt{5}}$ (d) none of these

4. The point on the line $3x - 2y = 1$ which is closest to the origin is

(a) (3/13, –2/13) (b) (5/11, 2/11)

(c) (3/5, 2/5) (d) none of these

5. The co-ordinates of the orthocentre of the triangle formed by the lines $2x^2 - 2y^2 + 3xy + 3x + y + 1 = 0$ and $3x + 2y + 1 = 0$ are

(a) (4/5, 3/5) (b) (–3/5, –1/5)

(c) (1/5, –4/5) (d) (2/5, 1/5)

6. The value of a for which the image of the point $(a, a - 1)$ w.r.t. the line mirror $3x + y = 6a$ is the point $(a2 + 1, a)$ is

(a) 0 (b) 1

(c) 2 (d) none of these

7. If a, b, c are in A.P. then the family of lines $ax + by + c = 0$

(a) passes through a fixed point

(b) cuts equal intercepts on both the axes

(c) forms a triangle with the axes with area

$=\frac{1}{2}|a+c-2b|$

(d) none of these

8. A vertex of an equilateral triangle is at (2, 3), and the equation of the opposite side is $x + y = 2$, then the equation of the other two sides are

(a) $y=\left(2+\sqrt{3}\right)(x-2);\left(y-3=2\sqrt{3}\right)(x-2)$

(b) $y-3=\left(2+\sqrt{3}\right)(x-2);y-3=\left(2-\sqrt{3}\right)(x-2)$

(c) $y+3=\left(2-\sqrt{3}\right)(x-2);y-3=\left(2-\sqrt{3}\right)(x+2)$

(d) none of these

9. A line through A (–5, –4) meets the lines $x + 3y + 2 = 0$, $2x + y + 4 = 0$ and $x - y - 5 = 0$ at B, C and D respectively.

If $\left(\frac{15}{AB}\right)^2+\left(\frac{10}{AC}\right)^2=\left(\frac{6}{AD}\right)^2$, then the equation of the line is

(a) $2x + 3y + 22 = 0$ (b) $5x - 4y + 7 = 0$

(c) $3x - 2y + 3 = 0$ (d) none of these

10. Let A(h, k), B(1, 1) and C(2, 1) be the vertices of a right angled triangle with AC as its hypotenuse. If the area of triangle is 1, then the set of the values of k is given by

(a) {0, 2} (b) {–1, 3}

(c) {–3, –2} (d) {1, 3}

11. Let PS be the median of the triangle with vertices P(2, 2), Q(6, –1) and R(7, 3). The equation of the line passing through (1, –1) and parallel to PS is

(a) $2x - 9y - 7 = 0$ (b) $2x - 9y - 11 = 0$

(c) $2x + 9y - 11 = 0$ (d) $2x + 9y + 7 = 0$

12. The pair of straight lines $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ be such that each pair bisects the angle between the other pair, then

(a) $pq = -1$ (b) $p = q$

(c) $p = -q$ (d) $pq = 1$

13. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals

(a) 1 (b) –1

(c) 3 (d) –3

14. If the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four times their product, then c has the value

(a) 1 (b) –1

(c) 2 (d) –2

15. If one of the lines $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is

(a) -2 (b) 1

(c) 2 (d) $-1/2$

16. Angle between the pair of straight lines $y^2 \sin^2\theta - xy \sin^2\theta + x^2(\cos^2\theta - 1) = 0$ is

(a) $\pi/3$ (b) $\pi/4$

(c) $2\pi/3$ (d) none of these

17. The centroid of the triangled formed by the pair of lines $12x^2 - 20xy + 7y^2 = 0$ and the line $2x - 3y + 4 = 0$ is

(a) $(-7/3, -7/3)$ (b) $(-8/3, -8/3)$

(c) $(8/3, 8/3)$ (d) $(4/3, 4/3)$

18. The image of the pair of lines represented by $ax^2 + 2hxy + by^2 = 0$ by the line mirror $y = 0$ is

(a) $ax^2 - 2hxy + by^2 = 0$ (b) $ax^2 - 2hxy - by^2 = 0$

(c) $bx^2 - 2hxy + ay^2 = 0$ (d) $bx^2 + 2hxy + ay^2 = 0$

19. The equation $x^2 + kxy + y^2 - 5x - 7y + 6 = 0$ represents a pair of straight lines, then k is

(a) 5/3 (b) 10/3

(c) 3/2 (d) 3/10

20. The gradient of one of the lines $ax^2 + 2hxy + by^2 = 0$ is twice that of the other, then

(a) $h^2 = ab$ (b) $h = a + b$

(c) $8h^2 = 9ab$ (d) $9h^2 = 8ab$

21. The angle between the straight lines, $x^2 - y^2 - 2x + 1 = 0$, is

(a) 75° (b) 36°

(c) 60° (d) 90°

22. Area of the triangle formed by the lines $y^2 - 9xy + 18x^2 = 0$ and $y = a$ is

(a) 27/4 (b) 0

(c) a/3 (d) $a^2/12$

23. The value of k such that $3x^2 - 11xy + 10y^2 - 7x + 13y + k = 0$ may represent a pair of straight lines is

(a) 3 (b) 4

(c) 6 (d) 8

24. The equation of image of pair of lines $y = |x - 1|$ in y-axis is

(a) $x^2 + y^2 + 2x + 1 = 0$ (b) $x^2 - y^2 + 2x - 1 = 0$

(c) $x^2 - y^2 + 2x + 1 = 0$ (d) none of these

25. Let $P \equiv (-1, 0)$, $Q \equiv (0, 0)$ and $R \equiv \left(3, 3\sqrt{3}\right)$ be three points. The equation of the bisector of angle PQR is

(a) $x + \frac{\sqrt{3}}{2}y = 0$ (b) $\frac{\sqrt{3}}{2}x + y = 0$

(c) $x + \sqrt{3}y = 0$ (d) $\sqrt{3}x + y = 0$

26. If a, b, c are variables such that $21a + 40b + 56c = 0$ then the family of lines $ax + by + c = 0$ passes through

(a) (7/14, 9/4) (b) (4/7, 3/8)

(c) (3/8, 5/7) (d) (2, 3)

27. A man starts from the point P(–3, 4) and reaches point Q(0, 1) touching x-axis at R(α, 0) such that PR + RQ is minimum, then α =

(a) 3/5 (b) –3/5

(c) 3 (d) none of these

28. The line $\ell_1 x + m_1 y + n = 0$ and $\ell_2 x + m_2 y + n = 0$ will cut the co-ordinate axes at concyclic points if

(a) $\ell_1 m_1 = \ell_2 m_2$ (b) $\ell_1 m_2 = \ell_2 m_1$

(c) $\ell_1 \ell_2 = m_1 m_2$ (d) $\ell_1 \ell_2 m_1 m_2 = n^2$

29. The equation of the line perpendicular to $2x + 6y + 5 = 0$ and having the length of x-intercept equal to 3 units can be

(a) $y = 3x + 5$ (b) $2y = 6x + 1$

(c) $y = 3x + 9$ (d) none of these

30. The distance of the point (1, 2) from the line $x + y = 0$ measured parallel to the line $3x - y = 2$ is

(a) 10 (b) $\frac{3\sqrt{10}}{4}$

(c) $\frac{3\sqrt{2}}{8}$ (d) $5\sqrt{5}$