WORKSHEET DAY 9 – STRAIGHT LINE

LEVEL 1

Question based on **Length of Perpendicular, foot of the perpendicular & image of the point with respect to line**

Q.51 The length of the perpendicular from the origin on the line $\sqrt{3}x - y + 2 = 0$ is -

(A) 3 (B) 1 (C) 2 (D) 2.5

Q.52 The length of perpendicular from (2, 1) on line $3x - 4y + 8 = 0$ is-

(A) 5 (B) 4 (C) 3 (D) 2

Q.53 The length of perpendicular from the origin on the line $x/a + y/b = 1$ is -

(A) $\frac{b}{\sqrt{a^2+b^2}}$ (B) $\frac{a}{\sqrt{a^2+b^2}}$

(C) $\frac{ab}{\sqrt{a^2+b^2}}$ (D) None of these

Q.54 The distance between the lines $5x + 12y + 13 = 0$ and $5x + 12y = 9$ is -

(A) 11/13 (B) 22/17

(C) 22/13 (D) 13/22

Q.55 The distance between the parallel lines $y = 2x + 4$ and $6x = 3y + 5$ is -

(A) $17/\sqrt{3}$ (B) 1

(C) $3/\sqrt{5}$ (D) $17\sqrt{5}/15$

Q.56 The foot of the perpendicular drawn from the point (7, 8) to the line $2x + 3y - 4 = 0$ is -

(A) $\left(\frac{23}{13}, \frac{2}{13}\right)$ (B) $\left(13, \frac{23}{13}\right)$

(C) $\left(-\frac{23}{13}, -\frac{2}{13}\right)$ (D) $\left(-\frac{2}{13}, \frac{23}{13}\right)$

Q.57 The coordinates of the point Q symmetric to the point P(–5, 13) with respect to the line $2x - 3y - 3 = 0$ are -

(A) (11, –11) (B) (5, –13)

(C) (7, –9) (D) (6, –3)

Question based on **Lines passing through the Point of Intersection of two lines**

Q.58 The line passing through the point of intersection of lines $x + y - 2 = 0$ and $2x - y + 1 = 0$ and origin is -

(A) $5x - y = 0$ (B) $5x + y = 0$

(C) $x + 5y = 0$ (D) $x - 5y = 0$

Q.59 The equation of the line through the point of intersection of the line $y = 3$ and $x + y = 0$ and parallel to the line $2x - y = 4$ is -

(A) $2x - y + 9 = 0$ (B) $2x - y - 9 = 0$

(C) $2x - y + 1 = 0$ (D) None of these

Q.60 The equation of the line passing through the point of intersection of the line $4x - 3y - 1 = 0$ and $5x - 2y - 3 = 0$ and parallel to the line $2x - 3y + 2 = 0$ is -

(A) $x - 3y = 1$ (B) $3x - 2y = 1$

(C) $2x - 3y + 1 = 0$ (D) $2x - y = 1$

Q.61 The equation of a line perpendicular to the line $5x - 2y + 7 = 0$ and passing through the point of intersection of lines $y = x + 7$ and $x + 2y + 1 = 0$, is -

(A) $2x + 5y = 0$ (B) $2x + 5y = 20$

(C) $2x + 5y = 10$ (D) None of these

Q.62 The equation of straight line passing through the point of intersection of the lines $x - y + 1 = 0$ and $3x + y - 5 = 0$ and perpendicular to one of them is -

(A) $x + y - 3 = 0$ or $x - 3y + 5 = 0$

(B) $x - y + 3 = 0$ or $x + 3y + 5 = 0$

(C) $x - y - 3 = 0$ or $x + 3y - 5 = 0$

(D) $x + y + 3 = 0$ or $x + 3y + 5 = 0$

Question based on **Condition of concurrency**

Q.63 If a, b, c are in A.P., then $ax + by + c = 0$ will always pass through a fixed point whose coordinates are -

(A) (1, –2) (B) (–1, 2)

(C) (1, 2) (D) (–1, –2)

Q.64 The straight lines $ax + by + c = 0$ where $3a + 2b + 4c = 0$ are concurrent at the point

(A) (1/2, 3/4) (B) (3/4, 1/2)

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(C) (–3/4, –1/2) (D) (–3/4, 1/2)

Q.65 If the lines ax + 2y + 1 = 0, bx + 3y + 1 = 0, cx + 4y + 1 = 0 are concurrent, then a, b, c are in -
(A) AP (B) GP (C) HP (D) None

Q.66 Find the fix point through which the line x(a + 2b) + y(a + 3b) = a + b always passes for all values of a and b -
(A) (2, 1) (B) (1, 2)
(C) (2, –1) (D) (1, –2)

Question based on **Bisector of Angle between two Lines**

Q.67 The equation of the bisector of the angle between the lines 3x – 4y + 7 = 0 and 12x – 5y – 8 = 0 is -
(A) 99x –77y + 51 = 0, 21x + 27y – 131 = 0
(B) 99x –77y + 51 = 0, 21x + 27y + 131 = 0
(C) 99x –77y + 131 = 0, 21x + 27y – 51 = 0
(D) None of these

Q.68 The equation of the bisector of the acute angle between the lines 3x – 4y + 7 = 0 and 12x + 5y – 2 = 0 is -
(A) 11x – 3y – 9 = 0
(B) 11x – 3y + 9 = 0
(C) 21x + 77y – 101 = 0
(D) None of these

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LEVEL-2

(Question asked in previous AIEEE and IIT-JEE)

SECTION –A

Q.1 A square of side a lies above the x- axis and has one vertex at the origin. The side passing through the origin makes an angle α $(0 < \alpha < \frac{\pi}{4})$ with the positive direction of x- axis. The equation of its diagonal not passing through the origin is- **[AIEEE 2003]**

(A) $y(\cos\alpha + \sin\alpha) + x(\cos\alpha - \sin\alpha) = a$

(B) $y(\cos\alpha - \sin\alpha) - x(\sin\alpha - \cos\alpha) = a$

(C) $y(\cos\alpha + \sin\alpha) + x(\sin\alpha - \cos\alpha) = a$

(D) $y(\cos\alpha + \sin\alpha) + x(\sin\alpha + \cos\alpha) = a$

Q.2 Locus of centroid of the triangle whose vertices are (a cos t, a sin t), (b sin t, – b cos t) and (1, 0), where t is a parameter, is- **[AIEEE 2003]**

(A) $(3x + 1)^2 + (3y)^2 = a^2 - b^2$

(B) $(3x - 1)^2 + (3y)^2 = a^2 - b^2$

(C) $(3x - 1)^2 + (3y)^2 = a^2 + b^2$

(D) $(3x + 1)^2 + (3y)^2 = a^2 + b^2$

Q.3 The equation of the straight line passing through the point (4, 3) and making intercepts on the coordinate axes whose sum is – 1 is-

[AIEEE 2004]

(A) $\frac{x}{2} + \frac{y}{3} = -1$ and $\frac{x}{-2} + \frac{y}{1} = -1$

(B) $\frac{x}{2} - \frac{y}{3} = -1$ and $\frac{x}{-2} + \frac{y}{1} = -1$

(C) $\frac{x}{2} + \frac{y}{3} = 1$ and $\frac{x}{2} + \frac{y}{1} = 1$

(D) $\frac{x}{2} - \frac{y}{3} = 1$ and $\frac{x}{-2} + \frac{y}{1} = 1$

Q.4 The line parallel to the x-axis and passing through the intersection of the lines $ax + 2by + 3b = 0$ and $bx - 2ay - 3a = 0$, where $(a, b) \neq (0, 0)$ is - **[AIEEE-2005]**

(A) below the x-axis at a distance of 3/2 from it

(B) below the x-axis at a distance of 2/3 from it

(C) above the x-axis at a distance of 3/2 from it

(D) above the x-axis at a distance of 2/3 from it

Q.5 If non-zero numbers a, b, c are in H.P., then the straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point that point is –

[AIEEE-2005]

(A) (–1, 2) (B) (–1, –2)

(C) (1, – 2) (D) $\left(1, -\frac{1}{2}\right)$

Q.6 A straight line through the point A(3, 4) is such that its intercept between the axes is bisected at A. Its equation is – **[AIEEE 2006]**

(A) 3x – 4y + 7 = 0 (B) 4x + 3y = 24

(C) 3x + 4y = 25 (D) x + y = 7

Q.7 If (a, a^2) falls inside the angle made by the lines $y = \frac{x}{2}$, $x > 0$ and $y = 3x$, $x > 0$, then a belongs to

[AIEEE 2006]

(A) $(3, \infty)$ (B) $\left(\frac{1}{2}, 3\right)$

(C) $\left(-3, -\frac{1}{2}\right)$ (D) $\left(0, \frac{1}{2}\right)$

Q.8 The perpendicular bisector of the line segment joining P(1, 4) and Q(k, 3) has y-intercept-4. Then a possible value of k is - **[AIEEE 2008]**

(A) 2 (B) –2

(C) –4 (D) 1

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SECTION –B

Q.1 The orthocentre of the triangle formed by the lines xy = 0 and x + y = 1 is **[IIT 95]**

(A) $\left(\frac{1}{2},\frac{1}{2}\right)$ (B) $\left(\frac{1}{3},\frac{1}{3}\right)$

(C) (0, 0) (D) $\left(\frac{1}{4},\frac{1}{4}\right)$

Q.2 The diagonals of parallelogram PQRS are along the lines x + 3y = 4 and 6x – 2y = 7. Then PQRS must be a **[IIT 98]**

(A) rectangle (B) square

(C) cyclic quadrilateral (D) rhombus

Q.3 Orthocentre of the triangle whose vertices are A (0, 0), B (3, 4) & C (4, 0) is : **[IIT Scr. 2003]**

(A) $\left(3,\frac{3}{4}\right)$ (B) $\left(3,\frac{5}{4}\right)$

(C) (3, 12) (D) (2, 0)

Q.4 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 - **[IIT-Scr.-2000]**

(A) 2x – 9y – 7 = 0 (B) 2x – 9y – 11 = 0

(C) 2x + 9y – 11 = 0 (D) 2x + 9y + 7 = 0

Q.5 Find the number of integer value of m which makes the x coordinates of point of intersection of lines. 3x + 4y = 9 and y = mx + 1 integer.

[IIT-Scr.-2001]

(A) 2 (B) 0 (C) 4 (D) 1

Q.6 Area of the parallelogram formed by the lines y = mx, y = mx + 1, y = nx, y = nx + 1 is

[IIT-Scr.-2001]

(A) $|m + n| / (m – n)^2$ (B) $2 / |m + n|$

(C) $1 / |m + n|$ (D) $1 /|m – n|$

Q.7 A straight line through the origin O meets the parallel lines 4x + 2y = 9 and 2x + y + 6 = 0 at the points P and Q respectively. Then the point O divides the segment PQ in the ratio-

[IIT-Scr.-2002]

(A) 1 : 2 (B) 3 : 4

(C) 2 : 1 (D) 4: 3

Q.8 Let P = (–1, 0), Q = (0, 0) and R = $(3, 3\sqrt{3})$ be three points. Then the equation of the bisector of the angle PQR is-**[IIT-Scr.-2002/AIEEE-07]**

(A) $(\sqrt{3}/2)\, x + y = 0$ (B) $x + \sqrt{3}\, y = 0$

(C) $\sqrt{3}\, x + y = 0$ (D) $x + (\sqrt{3}/2)\, y = 0$

Q.9 Lines $L_1 : y – x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q, respectively. The bisector of the acute angle between L_1 and L_2 intersects L_3 at R.

[IIT-2007]

STATEMENT–1 : The ratio PR : RQ equals $2\sqrt{2} : \sqrt{5}$

because

STATEMENT–2 : In any triangle, bisector of an angle divides the triangle into two similar triangles.

(A) Statement–1 is True, Statement–2 is True; Statement–2 is a correct explanation for Statement–1.

(B) Statement–1 is True, Statement–2 is True; Statement–2 is NOT a correct explanation for Statement–1

(C) Statement–1 is True, Statement–2 is False

(D) Statement–1 is False, Statement–2 is True

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LEVEL- 1

Qus.	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68		
Ans.	B	D	C	C	D	A	A	A	A	C	A	A	A	B	A	C	A	B		

LEVEL - 2

SECTION-A

Q.No.	1	2	3	4	5	6	7	8
Ans.	A	C	D	A	C	B	B	C

SECTION-B

Q.No.	1	2	3	4	5	6	7	8	9
Ans.	C	D	A	D	A	D	B	C	C