

STRAIGHT LINES

PREVIOUS EAMCET BITS

1. The point on the line $3x + 4y = 5$ which is equidistant from $(1, 2)$ and $(3, 4)$ is [EAMCET 2009]
1) $(7, -4)$ 2) $(15, -10)$ 3) $(1/7, 8/7)$ 4) $(0, 5/4)$

Ans: 2

Sol. Verification

2. The equation of the straight line perpendicular to the straight line $3x + 2y = 0$ and passing through the point of intersection of the lines $x + 3y - 1 = 0$ and $x - 2y + 4 = 0$ is [EAMCET 2009]
1) $2x - 3y + 1 = 0$ 2) $2x - 3y + 3 = 0$ 3) $2x - 3y + 5 = 0$ 4) $2x - 3y + 7 = 0$

Ans: 4

Sol. $L_1 + \lambda L_2 = 0$ is perpendicular to $3x + 2y - 0$ then find λ

3. The value of k such that the lines $2x - 3y + k = 0$, $3x - 4y - 13 = 0$ and $8x - 11y - 33 = 0$ are concurrent, is [EAMCET 2008]
1) 20 2) -7 3) 7 4) -20

Ans: 2

Sol. Given lines are concurrent $\Rightarrow \begin{vmatrix} 2 & -3 & k \\ 3 & -4 & -13 \\ 8 & -11 & -33 \end{vmatrix} = 0$

$$\Rightarrow 2(132 - 143) + 3(-99 + 104) + k(-33 + 32) = 0 \Rightarrow -22 + 15 - k = 0 \Rightarrow k = -7$$

4. The angle between the line joining the points $(1, -2)$, $(3, 2)$ and the line $x + 2y - 7 = 0$ is

[EAMCET 2007]

- 1) π 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{6}$

Ans: 2

Sol. Slope of line joining $(1, -2)$, $(3, 2)$ is $m_1 = 2$

Slope of the line $x + 2y - 7 = 0$ is $-\frac{1}{2} = m_2$

$$m_1 m_2 = -1 \quad \therefore \theta = 90^\circ$$

5. If $A(2, -1)$ and $B(6, 5)$ are two points the ratio in which the foot of the perpendicular from $(4, 1)$ to AB divides it is [EAMCET 2007]
1) $8 : 15$ 2) $5 : 8$ 3) $-5 : 8$ 4) $-8 : 5$

Ans: 2

Sol. Equation of the line perpendicular to AB and passing through $(4, 1)$ is

$$2x + 3y - 11 = 0 \dots\dots(1)$$

(1) dividing AB in the ratio

$$-(ax_1 + by_1 + c); (ax_2 + by_2 + c)$$

$$-(4-3-11):(12+15-11) = 5:8$$

6. The lines $x - y - 2 = 0$, $x + y - 4 = 0$ and $x + 3y = 6$ meet in the common point **[EAMCET 2006]**

- 1) (1, 2) 2) (2, 2) 3) (3, 1) 4) (1, 1)

Ans: 3

Sol. Point of concurrence is the point of intersection of any two lines

Solving $x - y = 2$ and $x + y = 4$

$$x = 3, y = 1, (3, 1)$$

7. The equation of the straight line perpendicular to $5x - 2y = 7$ and passing through the point of intersection of the lines $2x + 3y = 1$ and $3x + 4y = 6$ is **[EAMCET 2005]**

- 1) $2x + 5y + 17 = 0$ 2) $2x + 5y - 17 = 0$ 3) $2x - 5y + 17 = 0$ 4) $2x - 5y = 17$

Ans: 1

Sol. Equation of line passing through $2x + 3y = 1$, and $3x + 4y = 6$ is

$$2x + 3y - 1 + k(3x + 4y - 6) = 0$$

$$\perp^{\text{lar}} \text{ to } 5x - 2y = 7, k = -4/7$$

$$\therefore 2x + 5y + 1 = 0$$

8. If the lines $4x + 3y - 1 = 0$, $x - y + 5 = 0$ and $kx + 5y - 3 = 0$ are concurrent, then $k = ..$

[EAMCET 2003]

- 1) 4 2) 5 3) 6 4) 7

Ans: 3

Sol.
$$\begin{vmatrix} 4 & 3 & -1 \\ 1 & -1 & 5 \\ k & 5 & -3 \end{vmatrix} = 0 \Rightarrow k = 6$$

9. If a straight line perpendicular to $2x - 3y + 7 = 0$ forms a triangle with the coordinate axes whose area is 3 sq. units, then the equation of the straight line(s) is **[EAMCET 2002]**

- 1) $3x + 2y = \pm 7$ 2) $3x + 2y = \pm 6$ 3) $3x + 2y = \pm 8$ 4) $3x + 2y = \pm 4$

Ans: 2

Sol. Perpendicular line form is $3x + 2y + K = 0$

$$\text{Area of } \Delta^{\text{le}} = \frac{c^2}{2|ab|} = \frac{K^2}{12} = 3 \Rightarrow K = \pm 6$$

10. For all values of a and b the line $(a + 2b)x + (a - b)y + (a + 5b) = 0$ passes through the point :

[EAMCET 2001]

- 1) (-1, 2) 2) (2, -1) 3) (-2, 1) 4) (1, -2)

Ans: 3

Sol. $(a + 2b)x + (a - b)y + (a + 5b) = 0$

$$a(x + y + 1) + b(2x - y + 5) = 0$$

It always passes through, the point of intersection of the lines

$$x + y + 1 = 0 \text{ and } 2x - y + 5 = 0 \text{ i.e., } (-2, 1)$$

11. The number of circles that touch all the straight lines $x + y - 4 = 0$, $x - y + 2 = 0$ and $y = 2$ is

[EAMCET 2001]

- 1) 1 2) 2 3) 3 4) 4

Ans: 4

Sol. The given lines form a triangle

∴ the No. circles are 4, i.e. incircle and three ex-circles of the triangle.

12. If the point (1, 2) and (3, 4) were to be on the same side of the line $3x - 5y + a = 0$, then

[EAMCET 2000]

- 1) $7 < a < 11$ 2) $a = 7$ 3) $a = 11$ 4) $a < 7$ or $a > 11$

Ans: 4

Sol. $3(1) - 5(2) + a = a - 7$

$$9 - 20 + a = a - 11$$

∴ $a - 7, a - 11$ having same sign $(a - 7)(a - 11) > 0$

∴ $a < 7$ (or) $a > 11$

13. The coordinates of the image of the origin O with respect to the straight line $x + y + 1 = 0$ are

[EAMCET 2000]

- 1) $(-1/2, -1/2)$ 2) $(-2, -2)$ 3) $(1, 1)$ 4) $(-1, -1)$

Ans: 4

Sol. $\frac{x}{1} = \frac{y}{1} = \frac{-2(1)}{2} \Rightarrow (x, y) = (-1, -1)$

14. The area of the triangle formed by the axes and the line $(\cosh\alpha - \sinh\alpha)x + (\cosh\alpha + \sinh\alpha)y = 2$, in square units is

[EAMCET 2000]

- 1) 4 2) 3 3) 2 4) 1

Ans: 3

Sol. Area = $\frac{c^2}{2|ab|}$

$$\frac{4}{2(\cosh^2 \alpha - \sinh^2 \alpha)} = 2$$
