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 $-\frac{1}{2} = m_2$

$m_1 m_2 = -1 \quad \therefore \theta = 90°$

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

$2x + 3y - 11 = 0$ ……..(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

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

$\perp^{lar}$ 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

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

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
$x+y+1=0$ and $2x-y+5=0$ 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

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

$9-20+a=a-11$

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

$\therefore$ 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 (coshα - sinhα)x + (coshα + sinhα) y = 2, in square units is **[EAMCET 2000]**

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

Ans: 3

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

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

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