DPP
DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : MATHS
DPP No. :3

Topic :-STRAIGHT LINES

241 **(d)**

Let the equation of the line be $\frac{x}{a}+\frac{y}{b}=1$. This cuts the coordinates axes at $A(a,0)$ and $B(0,b)$

The coordinates of the mid-point of the intercept AB between the axes are $(a/2, b/2)$

$\therefore \frac{a}{2}=1, \frac{b}{2}=2 \Rightarrow a=2, b=4$

Hence, the equation of the line is $\frac{x}{2}+\frac{y}{4}=1$ or, $2x+y=4$

242 **(b)**

We know that the coordinates of the incentre of triangle formed by the points

$O(0,0)$ $A(a,0)$ and $B(0,b)$ are

$\left(\frac{ab}{a+b+\sqrt{a^2+b^2}}, \frac{ab}{a+b+\sqrt{a^2+b^2}}\right)$

Here, $a=4$ and $b=3$

So, the Coordinates are $(12/12, 12/12)=(1,1)$

243 **(a)**

To make the given curves $x^2+y^2=4$ and $x+y=a$ homogeneous.

$x^2+y^2-4\left(\frac{x+y}{a}\right)^2=0$

$\Rightarrow a^2(x^2+y^2)-4(x^2+y^2+2xy)=0$

$\Rightarrow x^2(a^2-4)+y^2(a^2-4)-8xy=0$

Since, this is a perpendicular pair of straight lines.

$\therefore a^2-4+a^2-4=0$

$\Rightarrow a^2=4 \Rightarrow a=\pm 2$

Hence, required set of a is $\{-2, 2\}$.

244 **(b)**

Equation of bisector between the lines $x^2-2pxy-y^2=0$ is

$\frac{x^2-y^2}{1-(-1)}=\frac{xy}{-p}$

$\Rightarrow x^2+\frac{2xy}{p}-y^2=0$

Above lines will be same as the $x^2-2qxy-y^2=0$.

$\therefore \frac{1}{p}=-q$

$\Rightarrow pq=-1$

245 **(d)**

Since the diagonals of a rhombus bisect each other at right angle. Therefore, BD passes through (3,4) and is perpendicular to AC. So, its equation is

$y-4=-1(x-3) \Rightarrow x+y-7=0$

247 **(c)**

Slope of given line is $\frac{1}{\sqrt{3}}$, it's angle from positive x-axis is 30° . Now, lines making an angle 30° from it are either x-axis $(ie, y=0)$ or makes and angle 60° with positive x-axis $\left(ie, y=\sqrt{3}x+\lambda\right)$

248 **(d)**

Let the slopes be m, m^2

$\therefore m + m^2 = \frac{-2h}{b}$ and $mm^2 = \frac{a}{b}$

$\Rightarrow m^3 = \left(\frac{a}{b}\right)$

Now, $m(1+m) = \frac{-2h}{b}$

On cubing both sides, we get

$m^3[1 + m^3 + 3m(1+m)] = -\frac{8h^3}{b^3}$

$\Rightarrow \frac{a}{b}\left[1 + \frac{a}{b} + 3\left(\frac{-2h}{b}\right)\right] = \frac{-8h^3}{b^3}$

$\Rightarrow \frac{b+a}{b} - \frac{6h}{b} = \frac{-8h^3}{ab^2}$

$\Rightarrow b + a + \frac{8h^3}{ab} = 6h$

$\Rightarrow \frac{b+a}{h} + \frac{8h^2}{ab} = 6$

250 **(d)**

The equation of line BC is $x + y + 4 = 0$. Therefore, equation of a line parallel to BC is $x + y + k = 0$. This is at a distance 1/2 from the origin

$\therefore \left|\frac{k}{\sqrt{2}}\right| = \frac{1}{2} \Rightarrow k = \pm\frac{1}{\sqrt{2}}$

Since BC and the required line are on the same side of the origin. Therefore, $k = \pm\frac{1}{\sqrt{2}}$

Hence, the equation of the required lines is $x + y + \frac{1}{\sqrt{2}} = 0$

251 **(b)**

Slope of the given lines are

$m_1 = \frac{2+2}{3-1} = 2$ and $m_2 = -\frac{1}{2}$

Now, $m_1 \times m_2 = 2 \times \frac{-1}{2} = -1$

$\therefore$ Lines are perpendicular, so angle is $\frac{\pi}{2}$

252 **(c)**

Given equation of curve is

$y^2 - x^2 + 2x - 1 = 0$

Here, $a = -1, b = 1, c = -1, h = 0, g = 1, f = 0$

$\therefore \Delta = abc + 2fgh - af^2 - bg^2 - ch^2$

$= (-1)(1)(-1) + 2(0)1(0) - 0 - 1 - 0$

$= 1 - 1 = 0$

$\therefore$ Given equation is equation of pair of straight lines.

253 **(c)**

Let the points be $A(3,-4)$ and $B(5,2)$ and mid point of $AB = (4,-1)$

It is given that the bisecting line intersect the coordinate axes in the ratio 2: 1

$\therefore$ Point of coordinate axes are $(2k, 0)$ and $(0, k)$. The equation of line passing through the above point is

$y - 0 = \frac{k-0}{0-2k}(x - 2k)$

$\Rightarrow\ y = -\frac{1}{2}(x - 2k)$ ...(i)

Since, it passing through the mid point of AB ie, $(4,-1)$

$\therefore\ -1 = -\frac{1}{2}(4-2k)\ \Rightarrow\ k = 1$

On putting the value of k in Eq. (i), we get

$y = -\frac{1}{2}(x-2)\ \Rightarrow\ x + 2y = 2$

254 **(d)**

Let the coordinates of the third vertex C be (h, k).

Then, Area of $ABC = 20$ sq. units

$\Rightarrow \frac{1}{2}\begin{vmatrix} h & k & 1 \\ -5 & 0 & 1 \\ 3 & 0 & 1 \end{vmatrix} = \pm 20\ \Rightarrow k = \pm 5 \quad \ldots(\text{i})$

Since, (h, k) lies on $x - y = 2$ Therefore,

$h - k = 2 \qquad \ldots(\text{ii})$

Solving (i) and (ii), we find that the coordinates of the third vertex are $(-3, -5)$ or, $(7,5)$

255 **(c)**

Given lines are $ax + by + c = 0$ ...(i)

and a, b, c satisfy the relation

$3a + 2b + 4c = 0$ ...(ii)

Only option (c) satisfy both condition.

$\because a \cdot \frac{3}{4} + b \cdot \frac{1}{2} + c = 0$

$\Rightarrow 3a + 2b + 4c = 0$

256 **(a)**

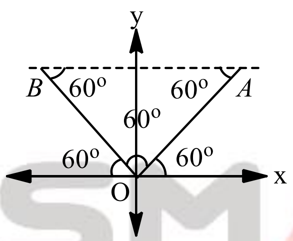
Here, $a_1 = 1, b_1 = -\sqrt{3}, a_2 = \sqrt{3}, b_2 = 1$

Now, $a_1a_2 + b_1b_2 = 1 \cdot \sqrt{3} + (-\sqrt{3}) \cdot 1 = 0$

$\therefore$ Lines are perpendicular, *ie*, $\theta = 90°$

257 **(a)**

Equation of OA is $y = \sqrt{3}x$. Equation of OB is $y = -\sqrt{3}x$ and equation of AB is $y = 1$



Clearly, from figure ΔOAB is an equilateral triangle.

258 **(a)**

The point of intersection of the lines $3x + y + 1 = 0$ and $2x - y + 3 = 0$ $\left(-\frac{4}{5}, \frac{7}{5}\right)$. The equation of line which makes equal intercepts with axes is $x + y = a$

$\therefore\ -\frac{4}{5} + \frac{7}{5} = a\ \Rightarrow\ a = \frac{3}{5}$

$\therefore$ Equation of line is $x + y - \frac{3}{5} = 0$

or $5x + 5y - 3 = 0$

259 **(c)**

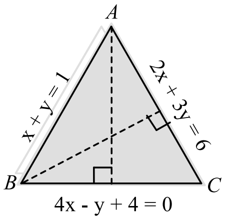
Let the line be $x/a + y/a = 1$. It passes through $(1, -2)$

$\therefore 1/a - 2/a = 1 \Rightarrow a = -1$

Hence, the equation of the line is $x + y = -1$

260 **(a)**

On solving line Ist and IInd, and Ist and IIIrd, we get $A(-3,4)$ and $B\left(-\frac{3}{5}, \frac{8}{5}\right)$.



The equation of perpendicular line to the line $4x - y + 4 = 0$ and passes through the point $A(-3, 4)$ is
$x + 4y - 13 = 0$ ...(i)

Also, the equation of perpendicular line to the line $2x + 3y = 6$ and passes through a point $B\left(-\frac{3}{5}, \frac{8}{5}\right)$ is
$3x - 2y + 5 = 0$ ...(ii)

On solving Eq. (i) and (ii), we get the orthocentre $\left(\frac{3}{7}, \frac{22}{7}\right)$

Which is lies in Ist quadrant.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	D	B	A	B	D	C	C	D	A	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	B	C	C	D	C	A	A	A	C	A