![DPP DAILY PRACTICE PROBLEMS]

Class : XIth | Solutions | Subject : MATHS
Date : | | DPP No. :7

Topic :-STRAIGHT LINES

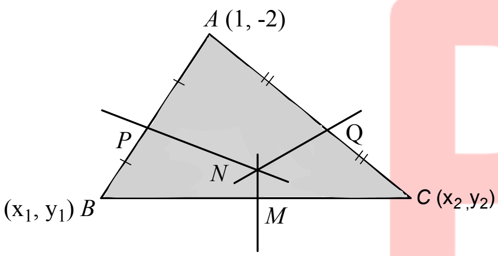
321 **(a)**

Let $B(x_1, x_1)$ and $C(x_2, y_2)$ be two vertices and

$P\left(\frac{x_1+1}{2}, \frac{y_1-2}{2}\right)$ lies on perpendicular bisector $x-y+5=0$

$$\therefore \frac{x_1+1}{2} - \frac{y_1-2}{2} = -5$$

$\Rightarrow x_1 - y_1 = -13$ ...(i)



Also, PN is perpendicular to AB.

$$\therefore \frac{y_1+2}{x_1-1} \times 1 = -1$$

$\Rightarrow x_1 + y_1 = -1$ ...(ii)

On solving Eqs. (i) and (ii), we get

$x_1 = -7, \ y_1 = 6$

$\therefore$ The coordinates of B are $(-7,6)$ Similarly, the coordinates of C are $\left(\frac{11}{5}, \frac{2}{5}\right)$

Hence, the equation of BC is

$$y-6 = \frac{\frac{2}{5}-6}{\frac{11}{5}+7}(x+7)$$

$$\Rightarrow y-6 = \frac{-14}{23}(x+7)$$

$\Rightarrow 14x + 23y - 40 = 0$

322 **(b)**

Points $(a, 0)$ and $(0, b)$ will satisfy the equation of line $px - qy = r$

$\Rightarrow ap = r, \ -bq = r$

$\therefore a+b=\frac{r}{p}-\frac{r}{q}=r\left(\frac{q-p}{pq}\right)$

323 **(d)**

We have,

$2x-y+4=0$ and $6x-3y-5=0$

$\Rightarrow 2x-y+4=0$ and $2x-y-5/3=0$

This distance between these two parallel lines is given by

$$d=\left|\frac{4+5/3}{\sqrt{2^2+(-1)^2}}\right|=\frac{17\sqrt{5}}{15}$$

324 **(b)**

If the lines given by $ax^2+5\,xy+2\,y^2=0$ arte mutually perpendicular, then

$a+2=0 \Rightarrow a=-2$

326 **(b)**

Since, the coordinates of three vertices A, B and C are $\left(\frac{5}{3},-\frac{4}{3}\right)$, $(0,0)$ and $\left(-\frac{2}{3},\frac{7}{3}\right)$ respectively, also the mid point of AC is $\left(\frac{1}{2},\frac{1}{2}\right)$, therefore the equation of line passing through $\left(\frac{1}{2},\frac{1}{2}\right)$ and $(0,0)$ is given by $x-y=0$, which is the required equation of another diagonal, so

$a=1, b=-1$, and $c=0$

327 **(d)**

Let m be the slope of required line

$$\therefore \left|\frac{m-(-1)}{1+m(-1)}\right|=1$$

$$\Rightarrow \frac{m+1}{1-m}=\pm 1$$

$\Rightarrow m+1=1-m, m+1=-1+m$

$\Rightarrow m=0, m=\infty$

$\therefore$ Equation of the line through $(1,1)$is $y-1=0, x-1=0$

328 **(a)**

Let the equation of line which is perpendicular to $5x-2y=7$, is

$2x+5y=\lambda$ ...(i)

The point of intersection of given lines is $(14,-9)$

Since, the Eq. (i) is passing through the point $(14,-9)$

$\therefore 2(14)+5(-9)=\lambda \Rightarrow \lambda=-17$

$\therefore$ Eq. (i) becomes

$2x+5y+17=0$

329 **(a)**

Let the vertices of the triangle be $A(5,-2)$,$B(-1,2)$ and $C(1,4)$

The equation of the altitude through $B(-1,2)$ is

$y+2=-(x-5) \Rightarrow x+y-3=0$ ...(i)

The equation of the altitude through $B(-1,2)$

$y-2=\frac{2}{3}(x+1) \Rightarrow 2x-3y+8=0$ ...(ii)

Solving (i) and (ii), we obtain that the coordinates of the orthocentre are $(1/5, 14/15)$

330 **(a)**

Since the origin and the point $(1, -3)$ lie on the same side of $x+2y-11=0$ and on the opposite side of $3x-6y-5=0$. Therefore, the bisector of the angle containing $(1, -3)$ is the bisector of that angle which does not contain the origin and is given by

$$\frac{-x-2y+11}{\sqrt{5}}=-\left(\frac{-3x+6y+5}{\sqrt{45}}\right) \Rightarrow 3x=19$$

ALITER Re-write the two equations in such a way that the values of the expressions on the left hand side of the equality for $x=1, y=-3$ become positive. Now, find the bisector corresponding to positive sign

331 **(c)**

For the two lines $24x+7y-20=0$ and $4x-3y-2=0$, the angle bisectors are given by $\frac{24x+7y-20}{25}=\pm\frac{4x-3y-2}{5}$

Talking positive sign, we get

$2x+11y-5=0$

$\therefore$ The given three lines are concurrent with one line bisecting the angle between the other two.

332 **(b)**

Let a and b be non-zero real numbers.

Therefore, the given equation

$(ax^2+by^2+c)(x^2-5xy+6y^2)=0$ implies either

$x^2-5xy+6y^2=0$

$\Rightarrow (x-2y)(x-3y)=0$

$\Rightarrow x=2y$ and $x=3y$

Represent two straight lines passing through origin.

or $ax^2+by^2+c=0$

When $c=0$ and a and b are of same signs, then

$ax^2+by^2+c=0$

$\Rightarrow x=0$ and $y=0$

Which is a point specified as the origin.

When $a=b$ and c is of sign opposite to that of a, then

$ax^2+by^2+c=0$ represents a circle.

Hence, the given equation,

$(ax^2+by^2+c)(x^2-5xy+6y^2)=0$

may represents two straight lines and a circle.

333 **(c)**

Equation of intersection of line is

$(100x+50y-1)+\lambda(75x+25y+3)=0$

$\Rightarrow (100+75\lambda)x+(50+25\lambda)y=-3\lambda$ ...(i)

$$\Rightarrow \frac{x}{\frac{1-3\lambda}{100+75\lambda}}+\frac{y}{\frac{1-3\lambda}{50+25\lambda}}=1$$

According to the given condition

$$\frac{1-3\lambda}{100+75\lambda}=\frac{1-3\lambda}{50+25\lambda}$$

$\Rightarrow 50=-50\lambda \Rightarrow \lambda=-1$

$\therefore$ From Eq. (i), we get

$25x + 25y - 4 = 0$

334 **(a)**

The coordinates of the point dividing the line segment joining (2,3) and $(-1,2)$ internally in the ratio 3 :4 are

$$\left(\frac{3 \times -1 + 4 \times 2}{3 + 4}, \frac{3 \times 2 + 4 \times 3}{3 + 4}\right) = \left(\frac{5}{7}, \frac{18}{7}\right)$$

This point lies on the line $x + 2y = \lambda$

$$\therefore \frac{5}{7} + \frac{36}{7} = \lambda \Rightarrow \lambda = \frac{41}{7}$$

335 **(d)**

Slopes of given lines are $m_1 = \sqrt{3}$ and $m_2 = \frac{1}{\sqrt{3}}$

$$\therefore \tan\theta = \left|\frac{\sqrt{3} - \frac{1}{\sqrt{3}}}{1 + 1}\right| = \left|\frac{3 - 1}{2\sqrt{3}}\right| = \frac{1}{\sqrt{3}}$$

$\Rightarrow \theta = 30°$

336 **(c)**

The coordinates of the vertices of the rectangle are $A(1,4)$, $B(6,4)$, $C(6,10)$, $D(1,10)$. The equation of diagonal AC is

$$y - 4 = \frac{10 - 4}{6 - 1}(x - 1) \Rightarrow 6x - 5y + 14 = 0$$

337 **(d)**

Let the equation of perpendicular line to the line

$3x - 2y = 6$ is $3y + 2x = c$ ...(i)

Since, it passes through (0, 2)

$\therefore c = 6$

On putting the value of c in Eq. (i) we get $3y + 2x = 6$

$$\Rightarrow \frac{x}{3} + \frac{y}{2} = 1$$

Hence, x-intercept is 3.

338 **(a)**

Given equation is $x^2 - 1005x + 2006 = 0$

$\Rightarrow (x - 2)(x - 1003) = 0$

$\Rightarrow x = 2, \quad x = 1003$

$\therefore$ Required distance between the lines

$= 1003 - 2 = 1001$

339 **(a)**

We have,

$\sqrt{3}\,x^2 - 4xy + \sqrt{3}\,y^2 = 0$

$\Rightarrow (\sqrt{3}\,x - y)(x - \sqrt{3}\,y) = 0$

$\Rightarrow \sqrt{3}\,x - y = 0, x - \sqrt{3}\,y = 0$

$\Rightarrow y = \sqrt{3}\,x, y = \frac{1}{\sqrt{3}}x$

These lines make $60°$ and $30°$ angles respectively with x-axis. If they are rotated about the origin by $\pi/6$ i.e. $30°$ in anticlockwise direction, then they make $90°$ and $60°$ angles respectively with x-axis. So, their equations in new position are $x = 0$ and $y = \sqrt{3}\, x$. The combined equation of these two lines is

$x(\sqrt{3}\, x - y) = 0$ or, $\sqrt{3}\, x^2 - xy = 0$

340 **(b)**

Le the equations of the sides AB,BC,CD and DA of the parallelogram $ABCD$ be respectively

$3\, x - 4\, y + 1 = 0$...(i) $4\, x - 3\, y - 2 = 0$...(ii)

$3\, x - 4\, y + 3 = 0$...(iii) $4\, x - 3\, y - 1 = 0$...(iv)

We know that the area of the parallelogram formed by the lines

$a_1x + b_1y + c_1 = 0$, $a_2x + b_2y + c_2 = 0$, $a_1x + b_1y + d_1 = 0$ and $a_2x + b_2y + d_2 = 0$ is given by

$$\left|\frac{(c_1 d_1)(c_2 - d_2)}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}}\right|$$

Hence, are Δ of the given parallelogram is given by

$$\Delta = \left|\frac{(3-1) \times (-1+2)}{\begin{vmatrix} 3 & -4 \\ 4 & -3 \end{vmatrix}}\right| = \frac{2}{7} \text{ sq. units}$$

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