RBSE BOARD

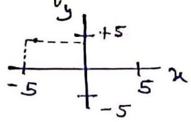
CLASS-X

SHARMA TUTION CLASSES ▶ Let's Rule it

COORDINATE GEOMETRY [PREVIOUS YEAR 2015-19]

① Write the distance of the point (-5, 4) from x-axis. [RBSE-2015]

Sol. Given, point is (-5, 4)



Then

x-axis is 4

② If K(5, 4) is the mid-point of the line segment PQ and coordinates of Q are (2, 3) then find the coordinates of point P. [RBSE 2015]

Sol. Given that, $Q = (2, 3)$

and Mid point $K = (5, 4)$

we know that, mid point of coordinate $= \left(\frac{x_1+x_2}{2}\right)\left(\frac{y_1+y_2}{2}\right)$

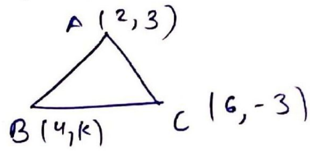
Here $x = \frac{x_1+x_2}{2}$ $\qquad$ $y = \frac{y_1+y_2}{2}$

$5 = \frac{2+x_1}{2} \Rightarrow x_1 = 8$ $\qquad$ $4 = \frac{3+y_1}{2} \Rightarrow y_1 = 5$

Hence, $P = (8, 5)$

③ Find the value of k if the points A(2, 3), B(4, k) and C(6, -3) are collinear.

Sol. Given A(2, 3) B(4, k) and C(6, -3) are collinear



Then,

Area of triangle = 0

So, $A = \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$

$0 = \frac{1}{2}[2(k+3) + 4(-3-3) + 6(3-k)]$

$0 = \frac{1}{2}[2k + 6 - 24 + 18 - 6k]$

$2k + 24 - 24 - 6k$

$-4k = 0 \Rightarrow \boxed{k = 0}$

(4) If the middle point of two points $A(-2, 5)$ and $B(-5, y)$ is $\left(-\frac{7}{2}, 3\right)$, then find the distance between points A and B. [RBSE 2016]

Sol. Given that, $A(-2, 5)$ and $B(-5, y)$

and

Mid point is $\left(-\frac{7}{2}, 3\right)$

$y = \frac{y_1 + y_2}{2} \Rightarrow 3 = \frac{y+5}{2}$

$y = 6 - 5 = 1$

Now, distance will be $D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(-5+2)^2 + (1-5)^2}$

$= \sqrt{9+16}$

$= \sqrt{25} = 5$

⑤ Find the area of Δ whose vertices are $(-5,7)$ $(4,5)$ and $(-4,-5)$. [RBSE 2016]

Sol. Consider,

A $(-5,7)$

B $(4,5)$ C $(-4,-5)$

$$\text{Area of } \Delta = \frac{1}{2}\left[x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right]$$

Here, $\underset{x_1\ \ y_1}{(-5,7)}$ $\underset{x_2\ \ y_2}{(4,5)}$ $\underset{x_3\ \ y_3}{(-4,-5)}$

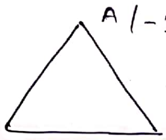
So
$$\Delta = \frac{1}{2}\left[-5(5-(-5))+4(-5-7)+(-4)(7-5)\right]$$
$$= \frac{1}{2}\left[-5\times10+4\times-12+(-4)(2)\right]$$
$$= \frac{1}{2}\left[-50-48-8\right]$$
$$= \frac{1}{2}\left[-106\right] = -53$$

So, Area of $\Delta = +53$ unit^2.

⑥ Find the area of the Δ whose vertices are $(-3,-2)$ $(5,-2)$ and $(5,4)$. Also prove it is right angle Δ. [RBSE 2017]

Sol. Consider

A $(-3,2)$



B $(5,-2)$ C $(5,4)$

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Area of $\Delta = \frac{1}{2} \left| [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2]\right|$

Given, $(-3,-2)$ $(5,-2)$ $(5,4)$

So, Area $= \frac{1}{2} \left| [-3(-2-4) + 5(4-(-2)) + 5(-2-(-2))] \right|$

$= \frac{1}{2} \left| [-3 \times -6 + 5 \times 6 + 5 \times 0] \right|$

$= \frac{1}{2} \left| -18 + 30 \right| = 6$ unit^2

Now, to prove it is an right angle triangle

$A(-3,-2)$, $B(5,-2)$, $C(5,4)$

$AB = \sqrt{(5-(-3))^2 + (-2+2)^2} = 8$

$BC = \sqrt{(5-5)^2 + (4+2)^2} = 6$

$CA = \sqrt{(5+3)^2 + (4+2)^2} = 10$

$CA^2 = AB^2 + BC^2$

$100 = 64 + 36 \Rightarrow 100 = 100$ Hp.

⑦ (i) If the distance b/w points $(x,3)$ and $(5,7)$ is 5. Then find the value of x.

(ii) Find the ratio in which the line $3x + y = 9$ divides the line segment joining the point $(1,3)$ and $(2,7)$. [RBSE 2018]

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Sol (i) Let $(x_1, y_1) = (x, 3)$

$(x_2, y_2) = (5, 7)$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$d = 5$

$5 = \sqrt{(5-x)^2 + (7-3)^2}$

squaring both side

$25 = (5-x)^2 + 16$

$25 - 16 = (5-x)^2$

$9 = (5-x)^2$

$(5-x) = \pm 3$

So, $5 - x = 3$

$x = 2$

$5 - x = -3$

$x = 8$

$x = 2, 8$

(ii) Let the line divides the point in $k:1$ ratio a/c to section formula

So

$\left(\frac{2k+1}{k+1}, \frac{7k+3}{k+1}\right) = (x, y)$

So, it must satisfy the given eq^n

$3\left(\frac{2k+1}{k+1}\right) + \frac{7k+3}{k+1} = 9$

$6k + 3 + 7k + 3 = 9(k+1)$

$13k + 6 = 9k + 9$

$4k = 3$

$k = \frac{3}{4}$

the ratio is $3:4$.

(8) If there are four points $P(2,-1)$ $Q(3,4)$, $R(-2,3)$ and $S(-3,2)$ in a plane, then prove that PQRS is not a square but Rhombus. [RBSE 2019]

Sol $PQ = \sqrt{(3-2)^2 + (4+1)^2} = \sqrt{1^2 + 5^2} = \sqrt{26}$ unit

$QR = \sqrt{(-2-3)^2 + (3-4)^2} = \sqrt{25+1} = \sqrt{26}$ unit

$RS = \sqrt{(-3+2)^2 + (-2-3)^2} = \sqrt{1+25} = \sqrt{26}$ unit

$SP = \sqrt{(-3-2)^2 + (-2-3)^2} = \sqrt{26}$ unit

Now,

Diagonal $PR = \sqrt{(-2-2)^2 + (3+1)^2} = \sqrt{16+16} = 4\sqrt{2}$ unit

$QS = \sqrt{(-3-3)^2 + (-2-4)^2} = \sqrt{36+36} = 6\sqrt{2}$ unit

Here sides $PQ = QR = RS = SP$

But $PR \neq QS$ (diagonal)

Hence, it is Rhombus.