



Co-Ordinate Geometry Ex 14.5 Q13

**Answer :**

GIVEN: If three points  $(x_1, y_1), (x_2, y_2)$  and  $(x_3, y_3)$  lie on the same line

TO PROVE:  $\frac{(y_2 - y_3)}{x_2 x_3} + \frac{(y_3 - y_1)}{x_3 x_1} + \frac{(y_1 - y_2)}{x_1 x_2} = 0$

PROOF:

We know that three points  $(x_1, y_1), (x_2, y_2)$  and  $(x_3, y_3)$  are collinear if

$$x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) = 0$$

$$\Rightarrow x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) = 0$$

Dividing by  $x_1 x_2 x_3$

$$\Rightarrow \frac{x_1(y_2 - y_3)}{x_1 x_2 x_3} + \frac{x_2(y_3 - y_1)}{x_1 x_2 x_3} + \frac{x_3(y_1 - y_2)}{x_1 x_2 x_3} = 0$$

$$\Rightarrow \frac{(y_2 - y_3)}{x_2 x_3} + \frac{(y_3 - y_1)}{x_1 x_3} + \frac{(y_1 - y_2)}{x_1 x_2} = 0$$

Hence proved.

Co-Ordinate Geometry Ex 14.5 Q14

**Answer :**

Since the point  $(x, y)$  lie on the line joining the points  $(1, -3)$  and  $(-4, 2)$ ; the area of triangle formed by these points is 0.

That is,

$$\Delta = \frac{1}{2} \{x(-3-2) + 1(2-y) - 4(y+3)\} = 0$$

$$-5x + 2 - y - 4y - 12 = 0$$

$$-5x - 5y - 10 = 0$$

$$x + y + 2 = 0$$

Thus, the result is proved.

Co-Ordinate Geometry Ex 14.5 Q15

**Answer :**

The formula for the area 'A' encompassed by three points  $(x_1, y_1), (x_2, y_2)$  and  $(x_3, y_3)$  is given by the formula,

$$A = \frac{1}{2} \begin{vmatrix} x_1 - x_2 & y_1 - y_2 \\ x_2 - x_3 & y_2 - y_3 \end{vmatrix}$$

$$A = \frac{1}{2} \{(x_1 - x_2)(y_2 - y_3) - (x_2 - x_3)(y_1 - y_2)\}$$

If three points are collinear the area encompassed by them is equal to 0.

The three given points are  $A(k, 3), B(6, -2)$  and  $C(-3, 4)$ . It is also said that they are collinear and hence the area enclosed by them should be 0.

$$A = \frac{1}{2} \begin{vmatrix} k - 6 & 3 + 2 \\ 6 + 3 & -2 - 4 \end{vmatrix}$$

$$A = \frac{1}{2} \begin{vmatrix} k - 6 & 5 \\ 9 & -6 \end{vmatrix}$$

$$0 = \frac{1}{2} |(k-6)(-6) - (9)(5)|$$

$$0 = \frac{1}{2} |-6k + 36 - 45|$$

$$0 = -6k + 36 - 45$$

$$6k = -9$$

$$k = -\frac{3}{2}$$

Hence the value of 'k' for which the given points are collinear is  $k = -\frac{3}{2}$ .

\*\*\*\*\* END \*\*\*\*\*