NCERT Solutions For Class 10 Chapter 7 Coordinate Geometry
Exercise 7.3

1. Find the area of the triangle whose vertices are:

(i) (2, 3), (−1, 0), (2, −4)

(ii) (−5, −1), (3, −5), (5, 2)

Ans. (i) (2, 3), (−1, 0), (2, −4)

Area of Triangle =

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

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

$$= \frac{1}{2}[2(0+4)-1(-7)+2(3)]$$

$$= \frac{1}{2}(8+7+6) = \frac{21}{2} \text{ sq. units}$$

(ii) (−5, −1), (3, −5), (5, 2)

Area of Triangle =

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

$$= \frac{1}{2}[-5(-5-2)+3\{2-(-1)\}+5\{-1-(-5)\}]$$

$$= \frac{1}{2}[-5(-7)+3(3)+5(4)]$$

$$= \frac{1}{2}(35+9+20)$$

$$= \frac{1}{2}(64) = 32 \text{ sq. units}$$

2. In each of the following find the value of 'k', for which the points are collinear.

(i) (7, −2), (5, 1), (3, k)

(ii) (8, 1), (k, −4), (2, −5)

Ans. (i) (7, −2), (5, 1), (3, k)

Since, the given points are collinear, it means the area of triangle formed by them is equal to zero.

Area of Triangle =

$$\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] = 0$$

$$\Rightarrow \frac{1}{2}\ [7\ (1 - k) + 5\ \{k - (-2)\} + 3\ (-2 - 1)]$$

$= \frac{1}{2}(7 - 7k + 5k + 10 - 9) = 0$

$\Rightarrow \frac{1}{2}(7 - 7k + 5k + 1) = 0$

$\Rightarrow \frac{1}{2}(8 - 2k) = 0$

$\Rightarrow 8 - 2k = 0$

$\Rightarrow 2k = 8$

$\Rightarrow k = 4$

(ii) (8, 1), (k, −4), (2, −5)

Since, the given points are collinear, it means the area of triangle formed by them is equal to zero.

Area of Triangle =

$$\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] = 0$$

$\Rightarrow \frac{1}{2}[8\{-4 - (-5)\} + k(-5 - 1) + 2\{1 - (-4)\}]$

$= \frac{1}{2}(8 - 6k + 10) = 0$

$\Rightarrow \frac{1}{2}(18 - 6k) = 0$

$\Rightarrow 18 - 6k = 0$

$\Rightarrow 18 = 6k$

$\Rightarrow k = 3$

3. Find the area of the triangle formed by joining the mid–points of the sides of the triangle whose vertices are (0, −1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

Ans. Let A = (0, −1) = (x_1, y_1), B = (2, 1) = (x_2, y_2) and

C = (0, 3) = (x_3, y_3)

Area of $\triangle ABC$ =

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

********** END **********