

# ASSIGNMENT-1

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ICSE 10 2018 - PROBLEM 7(C)

- (c) A(2, 5), B(-1, 2) and C(5, 8) are the vertices of a triangle ABC, 'M' is a point on AB such that AM : MB = 1 : 2. Find the co-ordinates of 'M'. Hence find the equation of the line passing through the points C and M.

**Solution:** According to the question, M is a point on the side AB such that

$$AM : MB = 1 : 2$$

When the line segment AB is divided internally by C in the ratio  $m : n$ , from Section formula, we get the Coordinates of point C as,

$$\left( \frac{\frac{mx_2 + nx_1}{m+n}}{\frac{my_2 + ny_1}{m+n}} \right), \text{ where}$$

$$A = \begin{pmatrix} x_1 \\ y_1 \end{pmatrix}, B = \begin{pmatrix} x_2 \\ y_2 \end{pmatrix}$$

From given data, using Section formula, we get

$$M = \begin{pmatrix} \frac{-1+4}{2+10} \\ \frac{2+10}{1+2} \end{pmatrix}$$

$$= \begin{pmatrix} 1 \\ 4 \end{pmatrix}$$

The equation of the line joining two points  $\begin{pmatrix} a \\ b \end{pmatrix}$  and  $\begin{pmatrix} c \\ d \end{pmatrix}$  is

$$(y - b) = \left( \frac{d-b}{c-a} \right) (x - a)$$

Here, the equation of the line joining points C  $\begin{pmatrix} 5 \\ 8 \end{pmatrix}$

and M  $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$  will be

$$(y - 4) = \left( \frac{8-4}{5-1} \right) (x - 1)$$

Simplified, we get the equation

$$(1 - 1)x + 3 = 0$$

which can also be represented as

$$x - y + 3 = 0$$

*But, However,*

On calculating, we get

1) The equation of the line joining A  $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$ , B  $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$  as  $(1 - 1)x + 3 = 0$

2) and the equation of the line joining B  $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$ , C  $\begin{pmatrix} 5 \\ 8 \end{pmatrix}$  as  $(1 - 1)x + 3 = 0$  too.

This implies that A, B, C points are 'collinear' and lie on the line  $x - y + 3 = 0$  and Hence, given points A, B, C don't form a triangle.

Verified by plotting the graph of A, B, C and M points :

