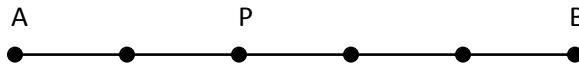


Lesson 3 – Division Point of a segment

Definition: The point P divides \overline{AB} in a given ratio (m:n).

Ex.



Point P divides \overline{AB} with a 3:2 ratio

AND

P is $\frac{3}{5}$ of the way on \overline{AB} .

Note: Alternatively we can say that P divides \overline{BA} with a 2:3 ratio and P is $\frac{2}{5}$ of the way on \overline{BA}

To find $P(x_p, y_p)$ (ie the coordinates of P) dividing \overline{AB} in the ratio m:n we use the following formulas:

$$x_p = x_1 + \frac{m}{m+n} (x_2 - x_1)$$

$$y_p = y_1 + \frac{m}{m+n} (y_2 - y_1)$$

Ex. Given A (-3,4) and B(6, 1) find the coordinates point P which divides \overline{AB} with a 2:1 ratio.

$$x_p = x_1 + \frac{m}{m+n} (x_2 - x_1)$$

$$y_p = y_1 + \frac{m}{m+n} (y_2 - y_1)$$

$$x_p = -3 + \frac{2}{2+1} (6 - -3)$$

$$y_p = 4 + \frac{2}{2+1} (1 - 4)$$

$$x_p = -3 + \frac{2}{3} (9)$$

$$y_p = 4 + \frac{2}{3} (-3)$$

$$x_p = -3 + 6$$

$$y_p = 4 + -2$$

$$x_p = 3$$

$$y_p = 2$$

Therefore the coordinates of P are (3,2).

