

19/ENG 04/024

MAT 102

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Electrical Electronics

1)  $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$

$$\begin{aligned} \vec{AB} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-2 - 6)^2 + (1 + 5)^2} = \sqrt{(-8)^2 + 6^2} \\ &= \sqrt{64 + 36} = \sqrt{100} \\ &= 10 \end{aligned}$$

$$\begin{aligned} \vec{AC} &= \sqrt{(x_3 - x_1)^2 + (y_3 - y_1)^2} \\ &= \sqrt{(0 - 6)^2 + (3 + 5)^2} = \sqrt{(-6)^2 + 8^2} \\ &= \sqrt{36 + 64} = \sqrt{100} \\ &= 10 \end{aligned}$$

$$\begin{aligned} \vec{BC} &= \sqrt{(x_3 - x_2)^2 + (y_3 - y_2)^2} \\ &= \sqrt{(0 + 2)^2 + (3 - 1)^2} = \sqrt{2^2 + 2^2} \\ &= \sqrt{8} = 2\sqrt{2} \end{aligned}$$

∴ points  $\triangle ABC$  forms an isosceles triangle because it has two equal lengths

2) a)  $x = \frac{Lx_1 + Kx_2}{L + K}$

where  $x = 5, x_1 = -4, x_2 = 14$   
 $L = ? , K = ?$

$$\Rightarrow 5x = \frac{-4L + 14K}{L+K}$$

$$5(L+K) = -4L + 14K$$

$$5L + 5K = -4L + 14K$$

$$5L + 4L = 14K - 5L$$

$$9L = 9K$$

$$L = K$$

$$K = K$$

$\therefore$  ratio = 1:1

$$y = \frac{Ly_1 + Ky_2}{L+K}$$

$$-3 = \frac{9L + 15K}{L+K}$$

$$-3L - 3K = 9L + 15K$$

$$15K - 3K = 9L + 3L$$

$$12K = 12L$$

$\therefore$  ratio = 1:1

b) R divides PQ

where  $x = 14, y = -5$

$x_1 = 5, y_1 = -3$

$x_2 = -4, y_2 = 9$

$L = 7, K = 1$

For x

$$x = \frac{Lx_2 - Kx_1}{L-K}$$

$$14 = \frac{-4L - 5K}{L-K}$$

$$L-K$$

$$14L - 14K = -4L - 5K$$

$$14L + 4L = 14K - 5K$$

$$18L = 9K$$

$$L/K = 9/18$$

$\therefore$  ratio = 1:2

For y

$$y = \frac{Ly_2 - Ky_1}{L-K}$$

$$-5 = \frac{9L + 3K}{L-K}$$

$$L-K$$

$$-5L + 5K = 9L + 3K$$

$$15K - 3K = 9L + 5L$$

$$12K = 14L$$

$$12/24 = L/K$$

$\therefore$  ratio = 1:2