

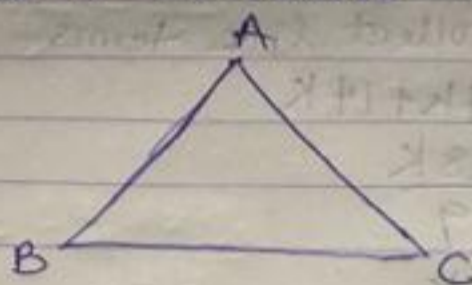
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COURSE: MATH 102

DEPARTMENT: AERONAUTICAL ENGINEERING

MATRIC NO: 19/ENGG07/013

1. To show it an isosceles Triangle



NOT TO SCALE

$$\text{Distance } AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\begin{aligned} \therefore x_1 &= 6 & y_1 &= -5 \\ x_2 &= -2 & y_2 &= 1 \end{aligned}$$

$$\text{Distance } AB = \sqrt{(-2 - 6)^2 + (1 - (-5))^2}$$

$$= \sqrt{(-8)^2 + (6)^2}$$

$$AB = \sqrt{64 + 36} = \sqrt{100} = 10$$

$$\text{Distance } AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\begin{aligned} x_1 &= 6 & y_1 &= -5 \\ x_2 &= 0 & y_2 &= 3 \end{aligned}$$

$$= \sqrt{(0 - 6)^2 + (3 - (-5))^2}$$

$$= \sqrt{(-6)^2 + (8)^2} = \sqrt{64 + 36} = \sqrt{100}$$

$$AC = 10$$

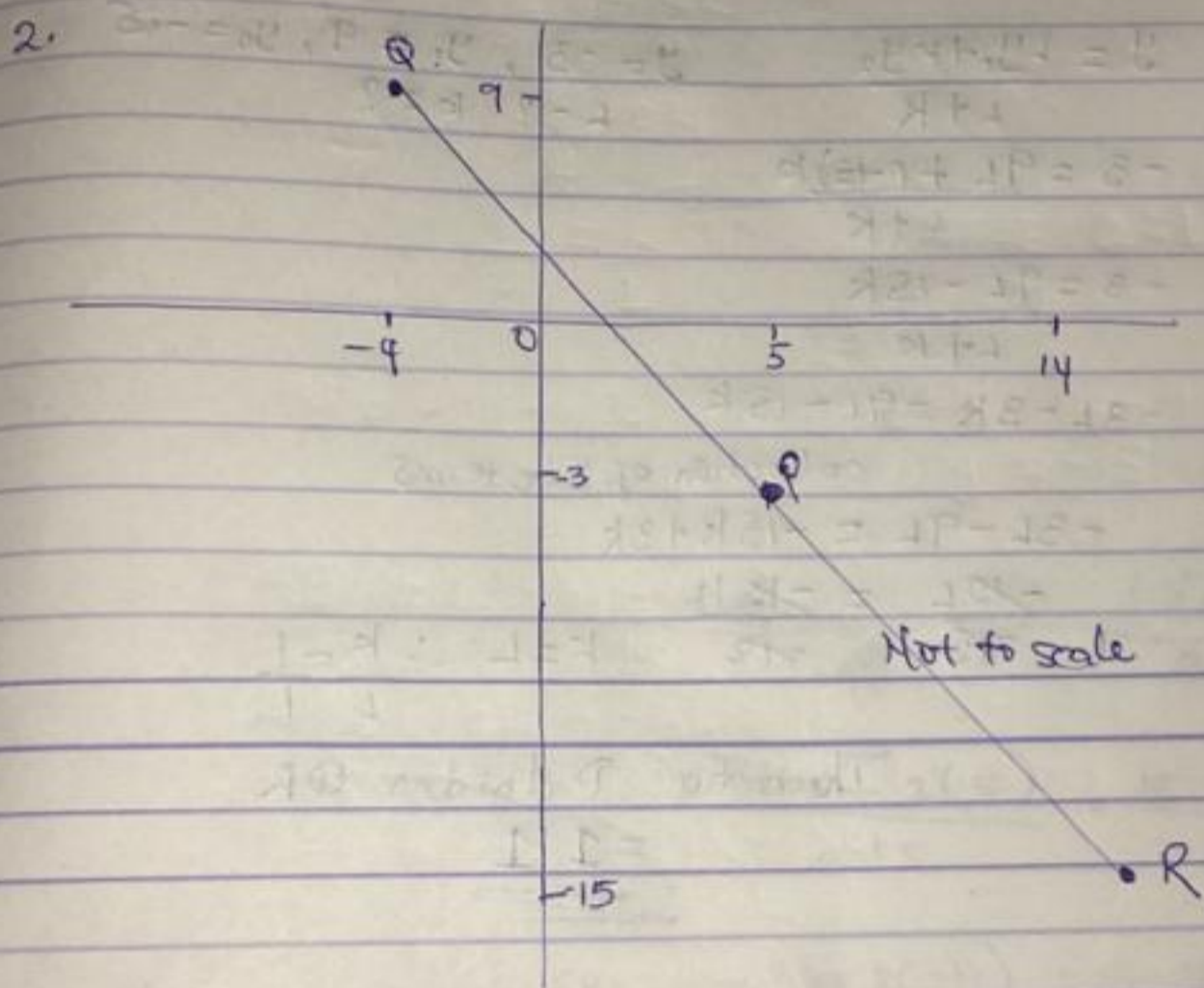
$$\text{Distance } BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\begin{aligned} x_1 &= -2 & y_1 &= 1 \\ x_2 &= 0 & y_2 &= 3 \end{aligned}$$

$$BC = \sqrt{(0-(-2))^2 + (3-1)^2}$$

$$= \sqrt{2^2 + 2^2} = \sqrt{4+4} = \sqrt{8}$$

$\therefore$  Since  $AB = AC$   
 $\therefore$  The Triangle is an isosceles triangle



(i) ratio P divides QR  
 P divides QR internally

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

$$x = 5, \quad x_1 = -4 \quad x_2 = 14$$

$$L = ? \quad K = ?$$

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



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

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

Collection of like terms

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

$$\frac{9L}{9} = \frac{9K}{9}$$

$$L = K \quad \therefore \frac{K}{L} = \frac{1}{1}$$

$\therefore$  The ratio is 1:1

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

$$y = -3, \quad y_1 = 9, \quad y_2 = -15$$

$$L = ? \quad K = ?$$

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

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

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

collection of like terms

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

$$\frac{-12L}{-12} = \frac{-12K}{-12}$$

$$K = L \quad \therefore \frac{K}{L} = \frac{1}{1}$$

The ratio P divides QR

$$= \underline{\underline{1:1}}$$

(ii) R divides PQ

R divides PQ externally

$$x = \frac{Lx_1 - Kx_2}{L-K}$$

$$x_1 = 5, \quad x_2 = -4 \quad x = 14$$

$$L = ? \quad K = ?$$



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

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

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

Collect like terms

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

$$\frac{9L}{9} = \frac{18K}{9}$$

$$\frac{L}{2} = \frac{2K}{L}$$

$$\frac{1}{2} = \frac{K}{L}$$

$$\text{Ratio} = \underline{\underline{1:2}}$$

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

$$y_1 = -3, y_2 = 9, y = -15$$

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

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

Collect like terms

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

$$-12L = -24K$$

$$-L = -2K$$

$$L = 2K$$

$$\frac{L}{2} = K$$

$$\frac{1}{2} = \frac{K}{L}$$

The ratio R divides  $\phi\phi$   
 $= 1:2$