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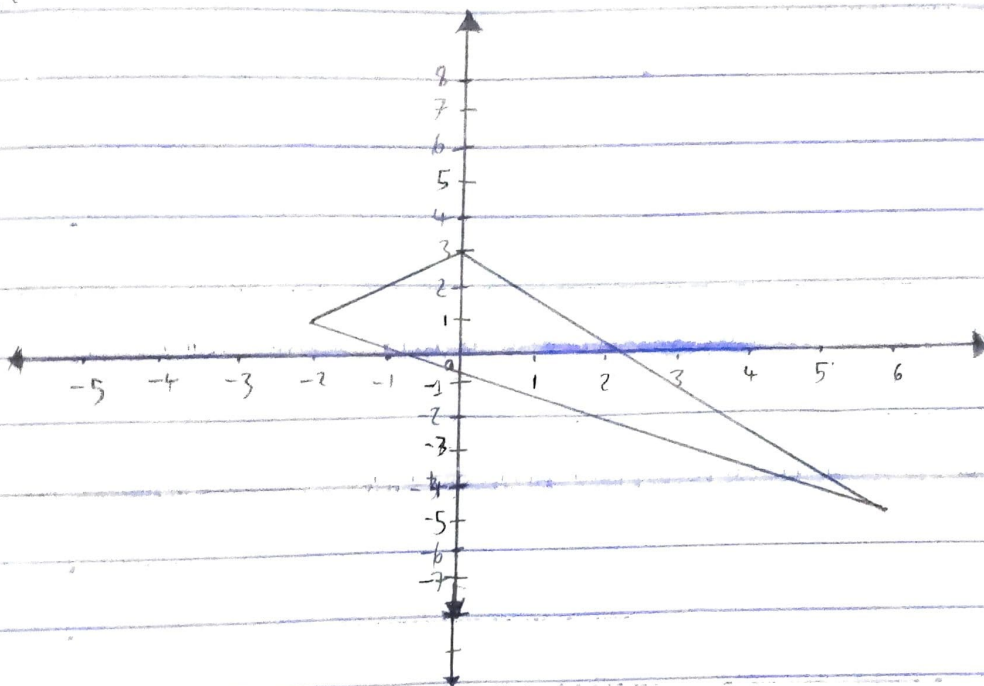
Course: MAT 102

Dept: Mechatronics 100 level Engineering

MAT 102 No: 19/ENG05/060

### Assignment

1) Show that the points  $A(6, -5)$ ,  $B(-2, 1)$ ,  $C(0, 3)$  form an isosceles triangle



$$\begin{aligned} \text{The distance between point AC} &= \sqrt{(0-6)^2 + (3-(-5))^2} \\ &= \sqrt{36 + 64} \\ &= 10 \end{aligned}$$

$$\begin{aligned} \text{Between Point AB} &= \sqrt{(-2-6)^2 + (1-(-5))^2} \\ &= \sqrt{64 + 36} \\ &= 10 \end{aligned}$$

$$\begin{aligned} \text{Between Points BC} &= \sqrt{(0-(-2))^2 + (3-1)^2} \\ &= \sqrt{4 + 4} \\ &= \sqrt{8} \end{aligned}$$

∴ The points  $A(6, -5)$ ,  $B(-2, 1)$ ,  $C(0, 3)$  form an isosceles triangle because two sides are equal

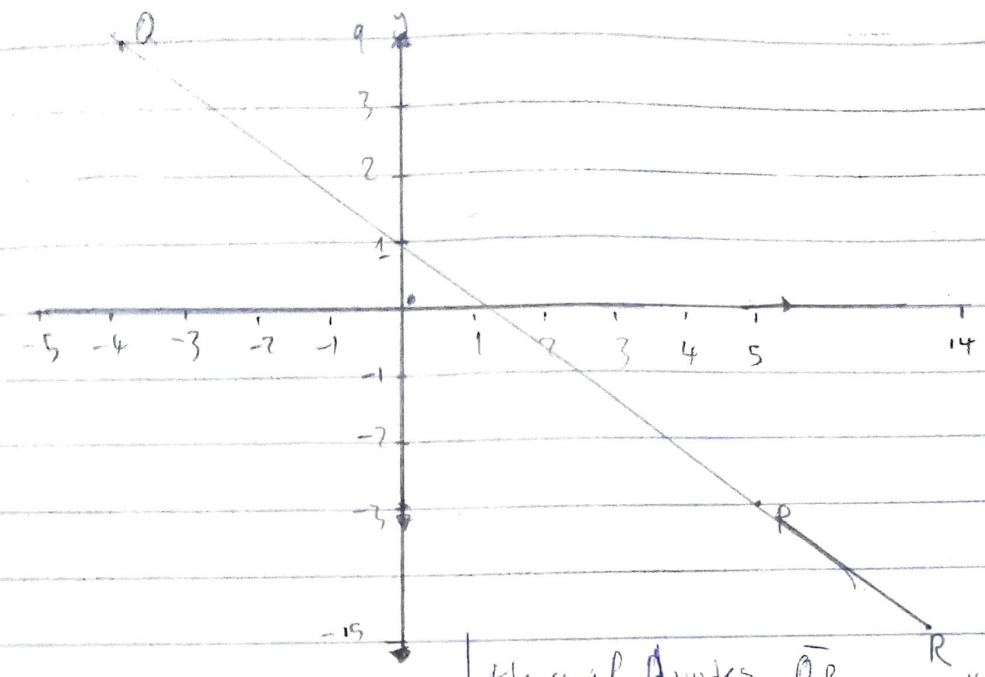
(2) If P, Q and R are points (5, -3), (-4, 9), and (14, -15) respectively, Find

The ratio in which

(a) P divides QR

(b) R divides PQ

Solution



Hence P divides QR internally in the ratio 1:1

P divides QR, Internally  
 $Q = (x_1, y_1), x_1 = -4$   
 $R = (x_2, y_2), x_2 = 14$   
 $P = (x, y), x = 5$

R divides PQ, externally  
 using  $y = \frac{ky_2 - y_1}{k - 1}$

where  $P = y_1 = -3$   
 $Q = y_2 = 9$   
 $R = y = -15$   
 $-15 = \frac{(k)(9) - (-3)}{k - 1}$

Using  
 $x = \frac{kx_2 + x_1}{1+k}$   
 $5 = \frac{k(14) + (-4)}{1+k}$   
 $5(1+k) = -4k + 14k$   
 $5 + 5k = -4k + 14k$   
 $14k - 5k = 5 + 4k$   
 $9k = 9k$

$-15(k-1) = (-3) - k(9)$   
 $-15k + 15 = -3 - 9k$   
 $15k + 9k = 15 - 3$   
 $24k = 12k$

$\therefore$  ratio is 1:1 Hence, R divides PQ externally in the ratio 2:1

ratio k:1 is 1:1