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 MATRIC NO: 19EN604/015 SERIAL NUMBER: 19  
 MAT102 ASSIGNMENT

(1) Show that the points  $A(6, -5)$ ,  $B(-2, 1)$  and  $C(0, 3)$  form an ~~isosceles~~ <sup>isosceles</sup> triangle

$$\overline{AB} = \sqrt{(-2-6)^2 + (1-(-5))^2} = \sqrt{(-8)^2 + (6)^2} = \sqrt{64+36}$$

$$= \sqrt{100} = 10$$

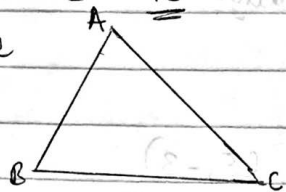
$$\overline{BC} = \sqrt{(0-(-2))^2 + (3-1)^2} = \sqrt{(2)^2 + (2)^2} = \sqrt{4+4}$$

$$= \sqrt{8} = 2\sqrt{2}$$

$$\overline{AC} = \sqrt{(0-6)^2 + (3-(-5))^2} = \sqrt{(-6)^2 + (8)^2} = \sqrt{36+64}$$

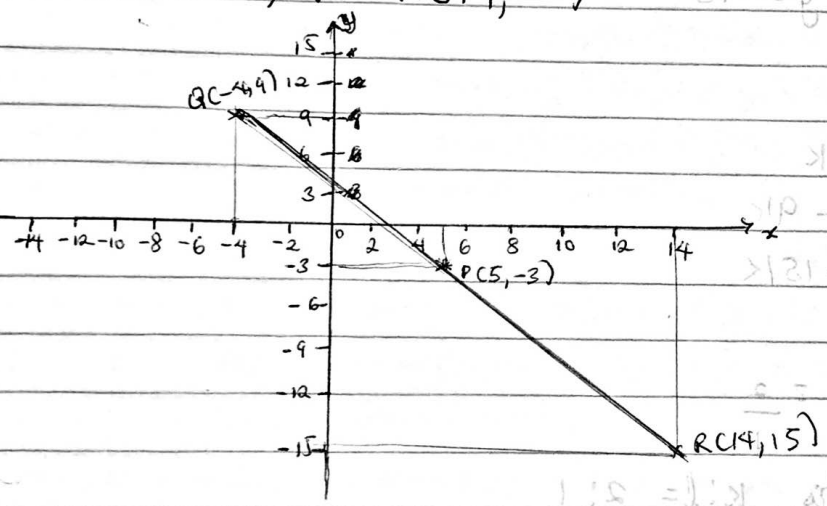
$$= \sqrt{100} = 10$$

$\therefore \overline{AB} = \overline{AC}$  let the triangle be



Since two sides of the triangle  $\overline{AB}$  and  $\overline{AC}$  are equal, it forms an ~~isosceles~~ <sup>isosceles</sup> triangle

(2)  $P(5, -3)$   $Q(-4, 9)$   $R(14, -15)$



(a) P divides  $\overline{QR}$  internally

From the graph,  $(x_1, y_1) = (-4, 9)$

$(x_2, y_2) = (14, -15)$

$(x, y) = (5, -3)$

let  $x_1 = -4$   $x_2 = 14$   $x = 5$

$$x = \frac{kx_2 + lx_1}{k+l}$$

$$5 = \frac{14k - 4l}{k+l}$$

$$5(k+l) = 14k - 4l$$

$$5k + 5l = 14k - 4l$$

$$5k - 14k = -4l - 15l$$

$$-9k = -9l$$

$$k = l$$

$\therefore$  the ratio  $k:l = 1:1$

$\therefore$  the ratio in which R divides  $\overline{QR}$  is 1:1

(b) R divides  $\overline{PQ}$  externally

$$y = \frac{ly_1 - ky_2}{l - k}$$

From the graph;  $(x_1, y_1) = (5, -3)$

$(x_2, y_2) = (-4, 9)$

$(x, y) = (14, -15)$

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

$$-15 = \frac{-3l - 9k}{l - k}$$

$$-15(l - k) = -3l - 9k$$

$$-15l + 15k = -3l - 9k$$

$$-15l + 3l = -9k - 15k$$

$$-12l = -24k$$

$$\frac{k}{l} = \frac{-24}{-12} = 2$$

$\therefore$  the ratio  $k:l = 2:1$

$\therefore$  the ratio in which R divides  $\overline{PQ}$  is 2:1