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DEPARTMENT: Electrical Electronics Engineering

MATRIC NO: 19/ENG04/042

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QUESTION

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

NOTE: an isosceles triangle have two equal sides.

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

$\bar{AB}$ = where $A = (6, -5)$ & $B = (-2, 1)$

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

$$= \sqrt{64 + 36}$$

$$= \sqrt{100}$$

$$= 10$$

$\bar{AC}$ = where $A = (6, -5)$ & $C = (0, 3)$

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

$$= \sqrt{36 + 64}$$

$$= \sqrt{100}$$

$$= 10$$

Since $\bar{AB} = \bar{AC}$, therefore the points A(6, -5), B(-2, 1) and C(0, 3) form a isosceles triangle.

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

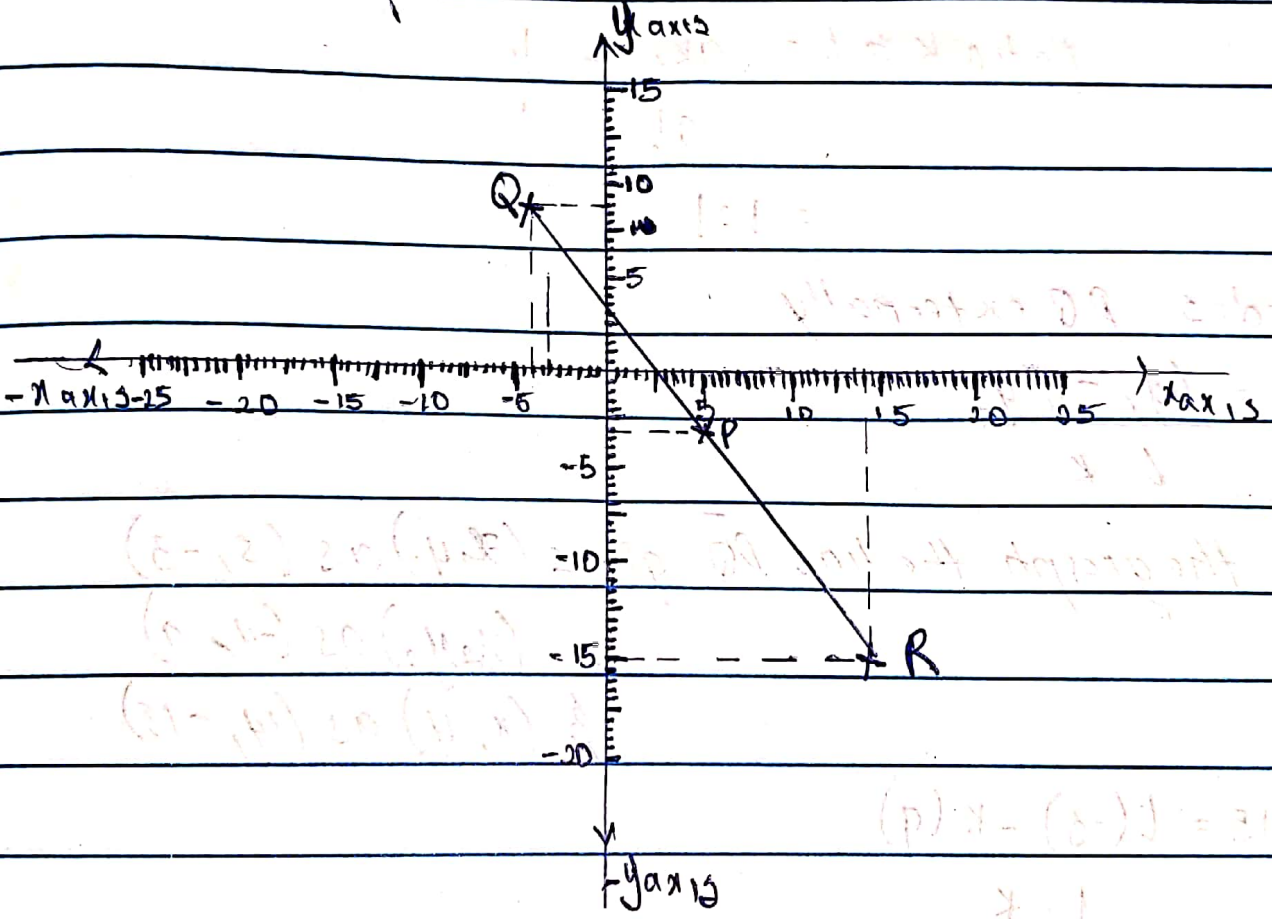
(b). R divides PQ

Solution:

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

x-axis = 1cm to 5units

y-axis = 1cm to 5 units



1) P divides QR internally

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

from the graph the line QR gives (x_1, y_1) as $(-4, 9)$

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

& (x, y) as $(5, -3)$

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

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

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

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

$$9l = 9k$$

$$\text{Ratio } k \text{ to } l = \frac{9k}{9l} = \frac{1}{1}$$

$$= 1:1$$

ii) R divides PQ externally

$$y = \frac{by_1 - ky_2}{l - k}$$

from the graph the line $\bar{PQ}$ gives (x_1, y_1) as $(5, -3)$

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

& (x, y) as $(14, -15)$

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

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

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

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

$$24k = 12l$$

$$\text{Ratio } k \text{ to } l = \frac{24k}{12l} = \frac{2}{1}$$

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