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Math 102 Assignment

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

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

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

$$x_2 = -2 \quad x_1 = 6$$

$$y_2 = 1 \quad y_1 = -5$$

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

For \overline{BC}

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

$$= \sqrt{(2)^2 + (2)^2}$$

$$x_2 = 0 \quad x_1 = -2$$

$$y_2 = 3 \quad y_1 = 1$$

$$\overline{BC} = \sqrt{4 + 4} = \sqrt{8} = 2.8$$

For \overline{AC}

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

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

$$x_2 = 0 \quad x_1 = 6$$

$$y_2 = 3 \quad y_1 = -5$$

$$\overline{AC} = \sqrt{36 + 64} = \sqrt{100} = 10$$

Since two of the distances are the same, points A, B and C form an 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 \overline{QR}

b) R divides \overline{PQ}

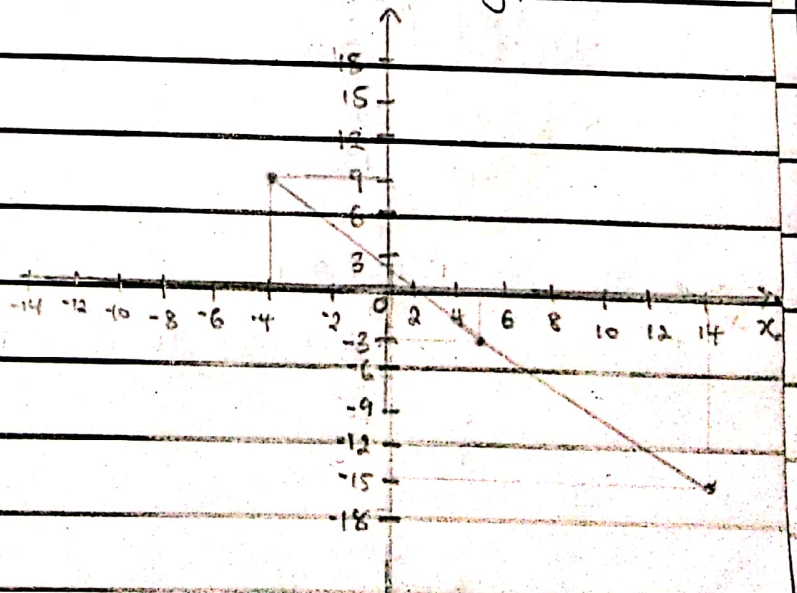
a) P divides \overline{QR} internally

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

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

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

$$\text{Let } x_1 = -4 \quad x_2 = 14, \quad x = 5$$



$$x = Kx_2 + Lx_1$$

$$K+L$$

$$S = \frac{Kx_2 + 4L}{K+L}, \quad 5(K+L) = 14K + 4L$$

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

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

$$-9K = -9L$$

$$K = L$$

$$\therefore K:L = 1:1$$

\therefore the ratio in which \bar{P} divides \bar{QR} is 1:1

b.) R divides \bar{PQ} externally

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

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

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

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

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

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

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

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

$$-12L = -24K$$

$$\frac{K}{L} = \frac{-24}{-12} = 2$$

\therefore the ratio $K:L = 2:1$

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