AZEEZ ASHRAF OCASUBOMI

MECHATRONICS ENGINEERING

19/ENG05/017

MR JOSEPH TEMITAYO OKUNLOLA

MAT102

April 7th 2020

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

Solution

A = (6, -5)

B = (2, 1)

C = (0, 3)

for ~~tri~~ AB

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

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

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

$$\sqrt{64 + 36}$$

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

For 1 in BC

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

$$BC = \sqrt{-2^2 + 2^2}$$

$$BC = \sqrt{4+4}$$

$$BC = \sqrt{8}$$

b)

for line AC

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

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

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

$$AC = \sqrt{100}$$

$$AC = 10$$

The triangle is an isosceles triangle $AB = 10$, $BC = \sqrt{8}$, $AC = 10$

2 If P, Q, and R are points $(5,-3)$ $(-4,9)$ and $(14,-15)$ respectively, find the ration in which

a. P divides QR

b R divides PQ

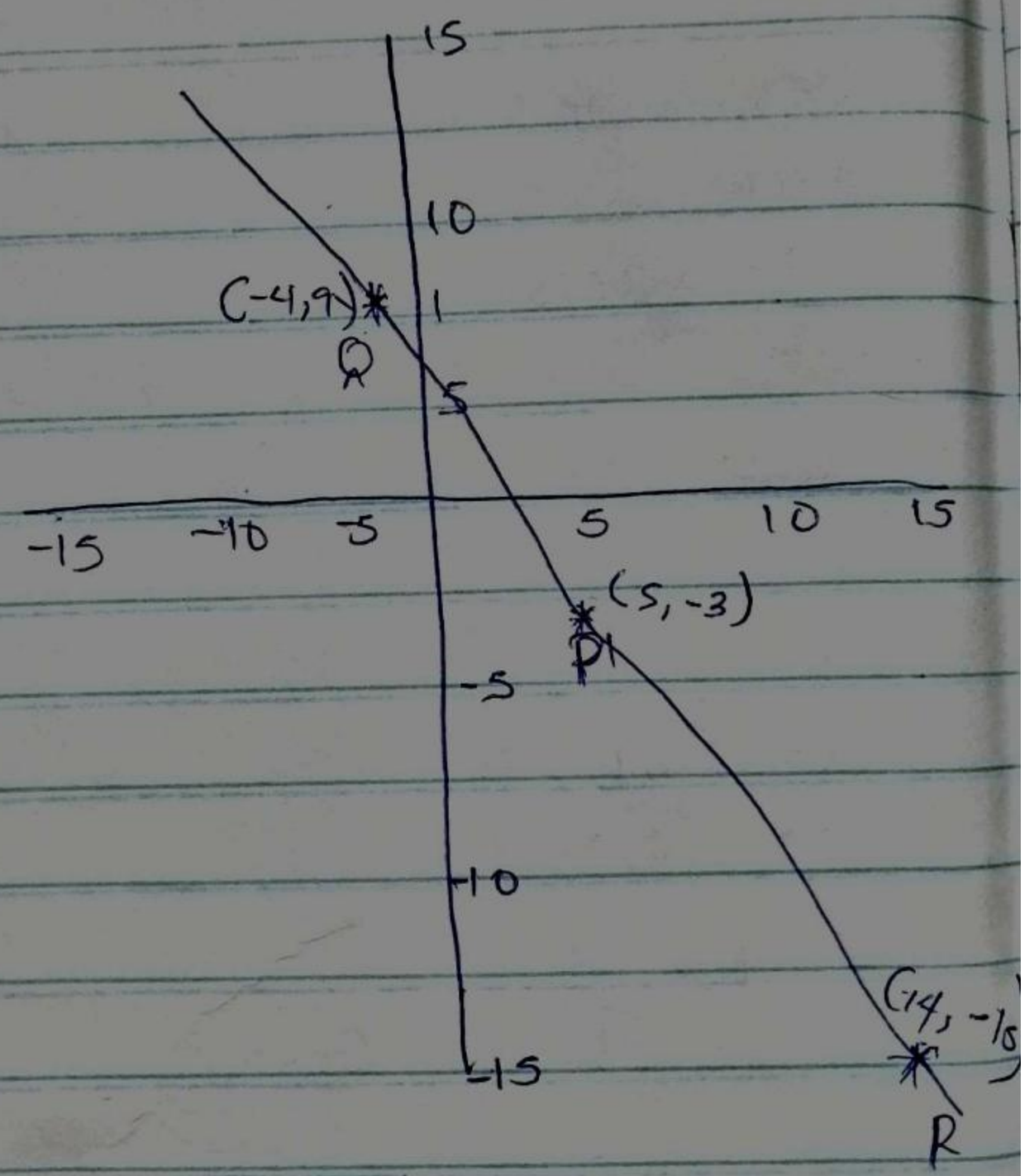
Solution

a. P divides QR internally

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

$Q = (-4,9)$ (x_1, y_1)

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



NOT TO SCALE

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

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

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

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

$$9l = 9k$$

$$\frac{l}{l} = \frac{k}{l}$$

$$k:l = 1:1$$

$$y = \frac{ly_1 + ly_2}{l+k}$$

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

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

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

$12k = 12l$

$\frac{k}{l} = \frac{1}{1}$

$k:l = 1:1$

11) R divides PQ externally

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

$P = (5, -3)$ (x_1, y_1)

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

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

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

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

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

$9l = +18k$

$\frac{k}{l} = \frac{1}{2}$

$k:l = 1:2$

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

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

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

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

$-12l = -24k$

$\frac{k}{l} = \frac{1}{2}$

$k:l = 1:2$