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Biomedical Eng

$$2) P = (5, -3)$$

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

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

1) P divides QR

$$(x_1, y_1) = Q$$

$$x_1 = -4$$

$$(x_2, y_2) = R$$

$$x_2 = 14$$

$$(x, y) = P$$

$$x = 5$$

$$x = \frac{Lx_1 + Kx_2}{L+K}$$

$$5 = \frac{L(-4) + K(14)}{L+K}$$

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

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

Collect like terms.

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

$$9L = 9K$$

$$L = K$$

$$\therefore \text{ratio} = 1:1$$

b) R divides PA

$$(x_1, y_1) = P$$

$$x_1 = 5, y_1 = -3$$

$$(x_2, y_2) = Q$$

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

$$(x, y) = R$$

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

$$-15 = \frac{L(-3) + K(9)}{L+K}$$

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

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

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

$$-12L = -6K$$

$$\therefore \text{ratio} = 2:1$$