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MAT 102 ASSIGNMENT 1

MECHANICS ENGINEERING

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

Soln

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

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

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

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

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

$$= 2\sqrt{2}$$

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

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

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

$\therefore |AC|$ and $|AB|$ are equal making $\triangle ABC$ isosceles

② If P, Q & R are points $(5, -3)$, $(-4, 9)$ & $(14, 15)$ respectively find the ratios which (a) P divides QR (b) R divides PQ

Soln

(a) P divides QR in ratio $= QP : PR$

$$|QP| = \sqrt{(-4 - 5)^2 + (9 - (-3))^2}$$

$$= \sqrt{81 + 144} = \sqrt{225} = 15$$

$$|PR| = \sqrt{(5 - 14)^2 + (-3 - 15)^2}$$

$$= \sqrt{81 + 144} = \sqrt{225}$$

$$= 15$$

$$QP : PR = 15 : 15 = 1 : 1$$

(b) R divides PQ in ratio $= PR : QR$

$$|PR| = 15$$

$$|QR| = \sqrt{(-4 - 14)^2 + (9 - 15)^2}$$

$$= \sqrt{324 + 546}$$

$$= \sqrt{900}$$

$$= 30$$

$$\therefore PR : QR = 15 : 30$$

$$= 1 : 2$$