

NAME: OKOH ELIJAH EROMOSELE AYOMIKUN

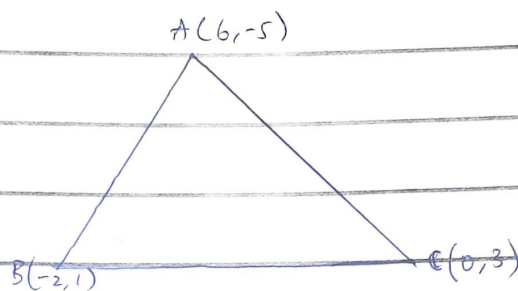
MATRIC NO: 19/ENG05/048

DEPT: MECHATRONICS ENGINEERING

SUBJECT: MAT 102 ASSIGNMENT

DATE: 09-04-2020 ~~10/04/20~~

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



For the Δ to be isosceles two sides must be equal: using distance between two points: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$$\text{for } |AB| = \sqrt{(-2-6)^2 + (1-(-5))^2} = \sqrt{(-8)^2 + 6^2} = \sqrt{64+36} = \sqrt{100} = 10 \text{ units}$$

$$|BC| = \sqrt{(0-(-2))^2 + (3-1)^2} = \sqrt{2^2 + 2^2} = \sqrt{8} \text{ units}$$

$$|AC| = \sqrt{(0-6)^2 + (3-(-5))^2} = \sqrt{(-6)^2 + 8^2} = \sqrt{36+64} = \sqrt{100} = 10 \text{ units}$$

Since $|AB| = |AC|$, The triangle is an isosceles triangle.

(2) $P(5, 3)$, $Q(-4, 9)$ and $R(14, -15)$ find the ratio in which

(a) P divides QR in ratio $PQ:PR$

$$|PQ| = \sqrt{(-4-5)^2 + (9-3)^2} = \sqrt{(-9)^2 + 6^2} \\ = \sqrt{81+36} = \sqrt{117} = 3\sqrt{13}$$

$$|PR| = \sqrt{(14-5)^2 + (-15-3)^2} = \sqrt{9^2 + (-18)^2} \\ = \sqrt{81+324} = \sqrt{405} = 9\sqrt{5}$$

$$\Rightarrow PQ:PR = 3\sqrt{13}:9\sqrt{5} = 1:\sqrt{5}$$

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

$$|PR| = 15 \text{ from question (a)}$$

$$|QR| = \sqrt{(14-(-4))^2 + (-15-9)^2} \\ = \sqrt{18^2 + (-24)^2} \\ = \sqrt{324+576} \\ = \sqrt{900} = 30$$

$$\Rightarrow PR:QR = 15:30 \\ = 1:2$$