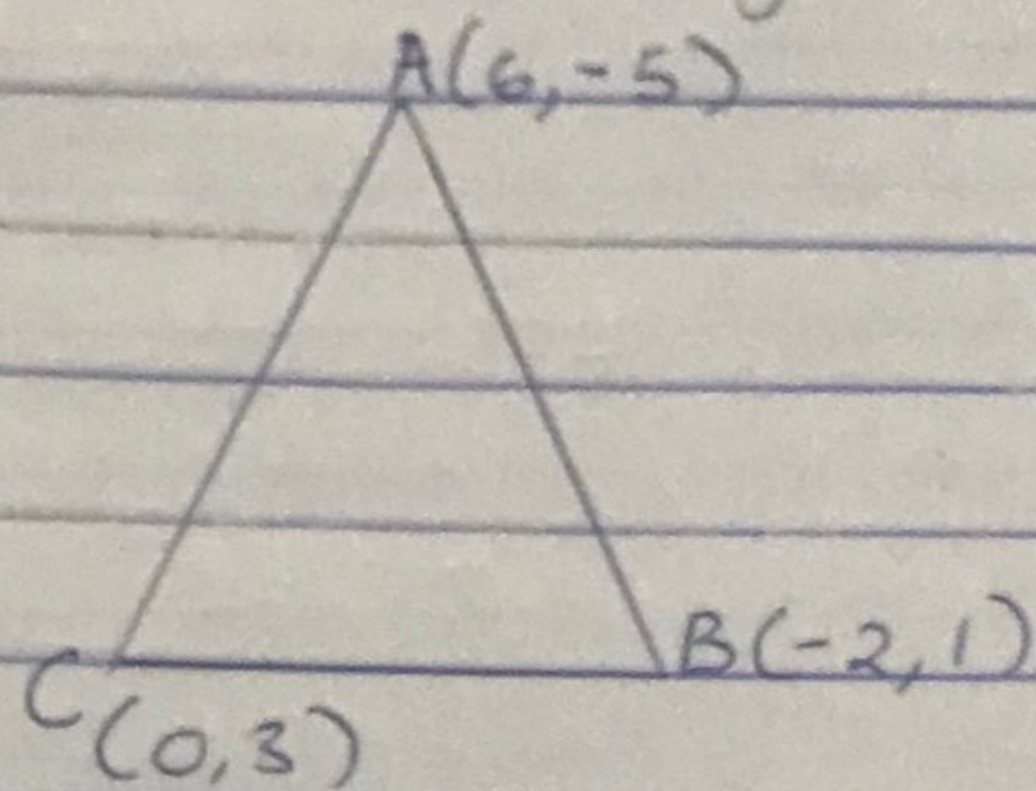


ELECT/ELECT ENGINEERING

19/ENG04/055

MAT 102 ASSIGNMENT

- (1) For $\triangle ABC$ to be an isosceles triangle two sides must be of equal length out of the three sides



Distance btw two points = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$$\begin{aligned}\text{length } \overline{AB} &= \sqrt{(6+2)^2 + (-5-1)^2} \\ &= \sqrt{64+36} \\ &= \sqrt{100} = 10\end{aligned}$$

$$\begin{aligned}\text{length } \overline{BC} &= \sqrt{(-2-0)^2 + (1-3)^2} \\ &= \sqrt{4+4} \\ &= \sqrt{8} = 2.83\end{aligned}$$

$$\begin{aligned}\text{length } \overline{CA} &= \sqrt{(0-6)^2 + (3+5)^2} \\ &= \sqrt{36+64} \\ &= \sqrt{100} = 10\end{aligned}$$

Since $\overline{AB} = \overline{CA}$, it proves that $\triangle ABC$ is an isosceles triangle

(2) P divides \overline{QR} internally

$$y = \frac{ly_1 + ky_2}{L+k}$$

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

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

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

$$-3 = \frac{9L - 15k}{L+k}$$

$$-3L - 3k = 9L - 15k$$

$$-12k = -12L$$

$$k:L = 1:1$$

(b) R divides \overline{PQ} externally

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

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

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

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

$$-15 = \frac{-3L - 9k}{L-k}$$

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

$$12L = 6k \quad -12L = -24k$$

$$k:L = 2:2 \quad k:L = 1:2$$