UNIT 3 LESSON 1 – MIDPOINT AND ENDPOINT

Line segment is a part of the line that has two endpoints

(x_1, y_1) AND (x_2, y_2)

The length of a line segment can be found using the distance formula.

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

The midpoint is the point on the line segment that divides it into two equal parts.

Midpoint formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Example 1) Calculate the midpoint of the line segment with endpoints (-2, 1) and (4, 10).

Step 1: Substitute endpoints into formula

Midpoint formula $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ = $\left(\frac{-2+4}{2}, \frac{1+10}{2}\right)$

Step 2: Calculate the midpoint

$\left(\frac{-2+4}{2}, \frac{1+10}{2}\right) = \left(\frac{2}{2}, \frac{11}{2}\right) = \left(1, \frac{11}{2}\right)$

Example 2) A line segment has one endpoint at (12, 0) and a midpoint of (10, -2). Locate the second endpoint.

Step 1: Substitute endpoints into formula

Midpoint = $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ =(10, -2) = $\left(\frac{12+x_2}{2}, \frac{0+y_2}{2}\right)$

Step 2: Find the value of x

$$10 = \frac{12 + x_2}{2}$$
$$2 * 10 = \frac{12 + x_2}{2} * 2$$
$$20 = 12 + x_2$$
$$x_2 = 8$$

Step 3: Find the value of y

$$-2 = \frac{0 + y_2}{2}$$
$$2 * -2 = \frac{0 + y_2}{2} * 2$$
$$-4 = 0 + y_2$$
$$y_2 = -4$$

YOU TRY!!!

EX 3) Find the midpoint of the coordinates (22, −9) and (−8, 25)

EX 4) Find the 2nd endpoint given the endpoint (1, 5) and the midpoint (2.5, 7.5)