



- I can perform calculations using the distance formula.
 - I can calculate the distance between two points.
 - I can apply the distance formula to solve a context problem.

Distance Formula: 1 dimension

$$D = |x_2 - x_1|$$

- Find the length of the line segment.



$$\begin{aligned} D &= |x_2 - x_1| \\ &= |23 - 11| \\ &= |12| \end{aligned}$$

$$D = 12 \Rightarrow \boxed{AB = 12}$$

Distance Formula: 2 dimensions

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

- Find the distance between two given points.

a) $\overset{x_1}{A}(3, \overset{y_1}{5})$ and $\overset{x_2}{B}(5, \overset{y_2}{7})$

$$\begin{aligned} D &= \sqrt{(5-3)^2 + (7-5)^2} \\ &= \sqrt{(2)^2 + (2)^2} \\ &= \sqrt{4+4} \\ &= \sqrt{8} \\ &\approx 2.8 \end{aligned}$$

$$\boxed{AB \approx 2.8}$$

b) $\overset{x_1}{R}(2, \overset{y_1}{3})$ and $\overset{x_2}{S}(4, \overset{y_2}{-1})$

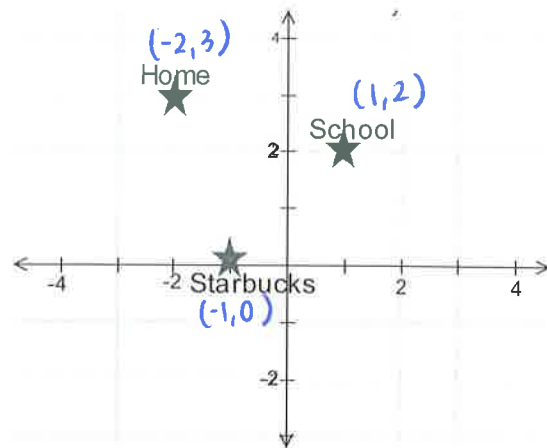
$$\begin{aligned} D &= \sqrt{(4-2)^2 + (-1-3)^2} \\ &= \sqrt{(2)^2 + (-4)^2} \\ &= \sqrt{4+16} \\ &= \sqrt{20} \\ &\approx 4.5 \end{aligned}$$

$$\boxed{RS \approx 4.5}$$

Extension: Is $\overline{AB} \cong \overline{RS}$? Explain ☺

No, $\overline{AB} \not\cong \overline{RS}$ because they are not the same length

3. In the diagram to the right, is the distance from Joan's home to school the same as the distance from Starbucks to Joan's home? Explain.



$$\begin{aligned}
 \text{Joan} \rightarrow \text{School} &= \sqrt{(1 - (-2))^2 + (2 - 3)^2} \\
 \begin{matrix} (-2, 3) & (1, 2) \\ x_1, y_1 & x_2, y_2 \end{matrix} &= \sqrt{(1+2)^2 + (2-3)^2} \\
 &= \sqrt{(3)^2 + (-1)^2} \\
 &= \sqrt{9+1} \\
 &= \sqrt{10} \\
 &\approx 3.2 \text{ miles}
 \end{aligned}$$

Yes, the distance from Starbucks to Joan's home is the same.

$$\begin{aligned}
 \text{Starbucks} \rightarrow \text{Joan} &= \sqrt{(-2 - (-1))^2 + (3 - 0)^2} \\
 \begin{matrix} (-1, 0) & (-2, 3) \\ x_1, y_1 & x_2, y_2 \end{matrix} &= \sqrt{(-2+1)^2 + (3)^2} \\
 &= \sqrt{(-1)^2 + 9} \\
 &= \sqrt{1+9} \\
 &= \sqrt{10} \\
 &\approx 3.2 \text{ miles}
 \end{aligned}$$