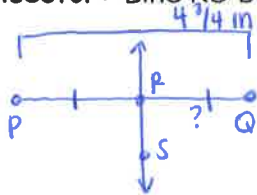




- I can perform calculations using the midpoint formula.
 - I can calculate the distance between two points.
 - I can apply the midpoint formula to solve a context problem.

Bisector: Line RS bisects \overline{PQ} at point R. Find RQ if $PQ = 4\frac{3}{4}$ inches.



change $4\frac{3}{4}$ to an improper fraction:

$$\rightarrow \frac{19}{4} \div \frac{2}{1} \Rightarrow \frac{19}{4} \cdot \frac{1}{2} = \frac{19}{8} = \boxed{2\frac{3}{8} \text{ in}}$$

OR

Divide the whole # and fraction by 2:

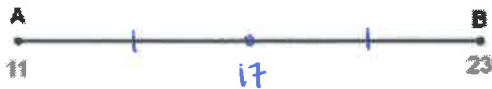
$$\begin{aligned} \rightarrow 4 \div 2 &= 2 \\ \rightarrow \frac{3}{4} \div \frac{2}{1} &= \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{8} \Rightarrow \boxed{2\frac{3}{8} \text{ in}} \end{aligned}$$

Each side is the same length so divide by 2

Midpoint Formula: 1 dimension

$$M = \frac{x_1 + x_2}{2} \leftarrow \text{average the } x \text{ values}$$

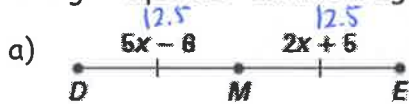
1. Find the midpoint of the line segment.



$$M = \frac{11 + 23}{2} = \frac{34}{2} = 17$$

$$\boxed{M=17}$$

2. Using Midpoints: In the diagram, M is the midpoint of the segment. Find DE.



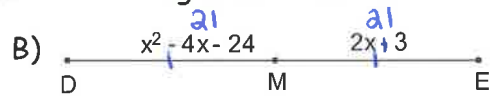
$$5x - 6 = 2x + 5 \quad DM = 5(3.7) - 6$$

$$3x - 6 = 6 \quad DM = 12.5$$

$$3x = 11$$

$$x = \frac{11}{3} \approx 3.7$$

$$DE = 12.5 + 12.5 = \boxed{25}$$



$$x^2 - 4x - 24 = 2x + 3 \leftarrow \text{get 1 side} = \text{to } 0$$

$$x^2 - 6x - 27 = 0 \leftarrow \text{Factor}$$

$$(x-9)(x+3) = 0$$

$$x=9, x=3 \leftarrow \text{check solutions}$$

$$ME = 2(9) + 3 = 21$$

$$ME = 2(-3) + 3 = -3 \times \text{not a solution, cant have a neg. distance}$$

$$\text{so } DE = 21 + 21 = \boxed{42}$$

Midpoint Formula: 2 dimensions

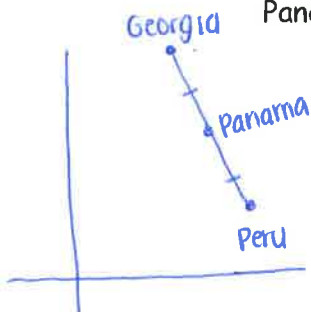
$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

avg x's avg y's

3. Find the midpoint of a line with the given endpoints: $A(4, -3)$ and $B(5, 6)$

$$M = \left(\frac{4+5}{2}, \frac{-3+6}{2} \right) = \left(\frac{9}{2}, \frac{3}{2} \right) = \boxed{(4.5, 1.5)}$$

4. Caliyaah is traveling to Peru for her summer vacation. She looks at a map of the path of her flight. Her plane leaves from Georgia, located at $(5, 16)$ on the map's coordinate grid, makes a stop at the halfway point, Panama, and then heads to its destination, Peru, located at $(7, 8)$ on the map's coordinate grid. Find the location of Panama on Caliyaah's map.



$$M = \left(\frac{5+7}{2}, \frac{16+8}{2} \right) = \left(\frac{12}{2}, \frac{24}{2} \right) = (6, 12)$$

Panama is located at $(6, 12)$

5. Find the second endpoint of the line with the given endpoint (P) and midpoint (M).

a) P(8, 0) and M(6, -5) (x_2, y_2)

b) P(7, -17) and M(-2, 3) (x_2, y_2)

x-values: $\frac{8+x_2}{2} = 6 \cdot 2$

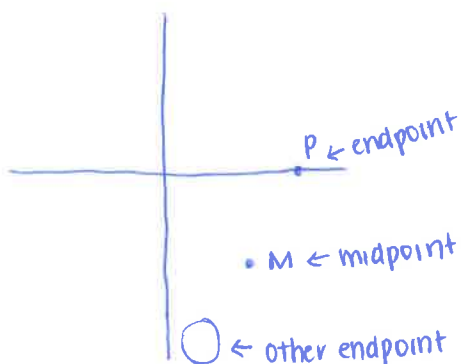
$\Rightarrow 8+x_2 = 12$

$\Rightarrow x_2 = 4$

y-values: $\frac{0+y_2}{2} = -5 \cdot 2$

$y_2 = -10$

Endpoint is at $(4, -10)$



x-values: $\frac{7+x_2}{2} = -2 \cdot 2$

$\Rightarrow 7+x_2 = -4$

$\Rightarrow x_2 = -11$

y-values: $\frac{-17+y_2}{2} = 3 \cdot 2$

$\Rightarrow -17+y_2 = 6$

$\Rightarrow y_2 = 23$

Endpoint is at $(-11, 23)$

