

Today's Warm - Up:

(you get points for putting this on your assignment)

- 1.** Find a point between $A(-3, 5)$ and $B(7, 5)$.
- 2.** Find the average of -11 and 5 .
- 3.** Solve $\frac{x + 7}{2} = 5$.
- 4.** Find $\sqrt{30}$ to the nearest hundredth.
- 5.** Find $\sqrt{5} + \sqrt{20}$ to the nearest hundredth.

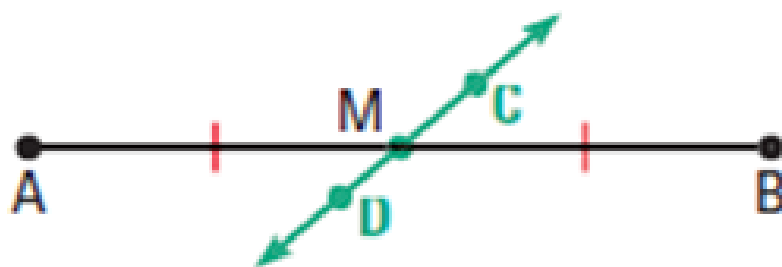
The Midpoint and Distance Formulas

midpoint - the point on a segment that divides it into 2 \cong segments.



M is the midpoint of \overline{AB} .
So, $\overline{AM} \cong \overline{MB}$ and $AM = MB$.

segment bisector - anything that goes through the midpoint.



\overleftrightarrow{CD} is a segment bisector of \overline{AB} .
So, $\overline{AM} \cong \overline{MB}$ and $AM = MB$.

Using the midpoint and bisector:

a. Point M is the midpoint of \overline{CT} . Find the length of \overline{TM} .

$$\begin{aligned} TM &= MC \\ 4x-1 &= 3x+3 \\ \underline{-3x+1 \quad -3x+1} \\ x &= 4 \end{aligned}$$



$$\begin{aligned} TM &= 4x-1 \\ &= 4 \cdot 4 - 1 \\ &= 15 \end{aligned}$$

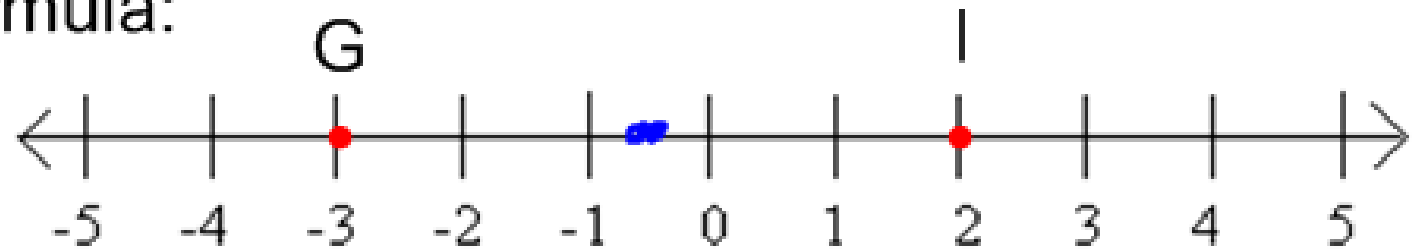
b. Point D is the bisect of \overline{KI} . Find DK.

$$\begin{aligned} KD &= DI \\ 5x-2 &= 3x+8 \\ \underline{-3x+2 \quad -3x+2} \\ 2x &= 10 \\ X &= 5 \end{aligned}$$



$$\begin{aligned} KD &= 5x-2 \\ &= 5 \cdot 5 - 2 \\ &= 23 \end{aligned}$$

Midpoint Formula:



How would you find the midpoint of \overline{GI} ?

$$\frac{-3+2}{2} = -\frac{1}{2}$$

Midpoint Formula:

If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in a coordinate plane, then the midpoint M of \overline{AB} has coordinates

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



a. The endpoints of \overline{GH} are $G(7, -2)$ and $H(-5, -6)$. Find the coordinates of the midpoint P .

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

$$P = \left(\frac{7 + (-5)}{2}, \frac{-2 + (-6)}{2} \right)$$

$$P = \left(\frac{2}{2}, \frac{-8}{2} \right)$$

$$P = (1, -4)$$

b. The midpoint of \overline{AB} is $M(5, 8)$. One endpoint is $A(2, -3)$. Find the coordinates of endpoint B .

$$(5, 8) = \left(\frac{x_1 + 2}{2}, \frac{y_1 + (-3)}{2} \right)$$

$$5 = \frac{x_1 + 2}{2}$$

$$8 = \frac{y_1 - 3}{2}$$

$$x_1 = 8$$

$$2 \cdot 8 = \frac{y_1 - 3}{2}$$

$$(8, 19)$$

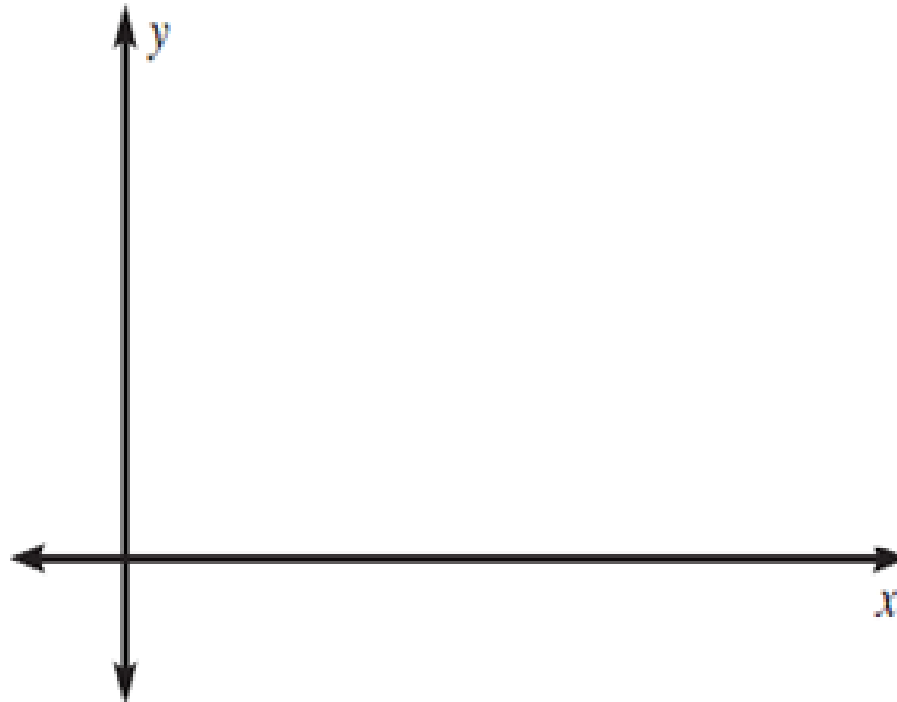
$$\frac{16}{+3} = \frac{y_1 - 3}{+3}$$

$$19 = y_1$$

Distance Formula:

If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in a coordinate plane, then the distance between A and B is

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



What is the approximate length of \overline{PQ} with endpoints $P(2, 5)$ and $Q(-4, 8)$? -

(A) 3.61

(B) 6.71

(C) 9.0

(D) 13.15

$$\begin{aligned}PQ &= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \\&= \sqrt{(2 - (-4))^2 + (5 - 8)^2} \\&= \sqrt{6^2 + (-3)^2} \\&= \sqrt{36 + 9} \\&= \sqrt{45} \approx 6.71\end{aligned}$$

Homework:

p 19-21

#'s 2-22 E, 25, 26, 28

32-40 E, 44, 49, 60-64 E

Quiz Next Time!!!