Name _____

The Midpoint Formula

Remember

To find the midpoint between two ordered pairs, add the x-coordinates and divide by 2, then add the y-coordinates and divide by 2.

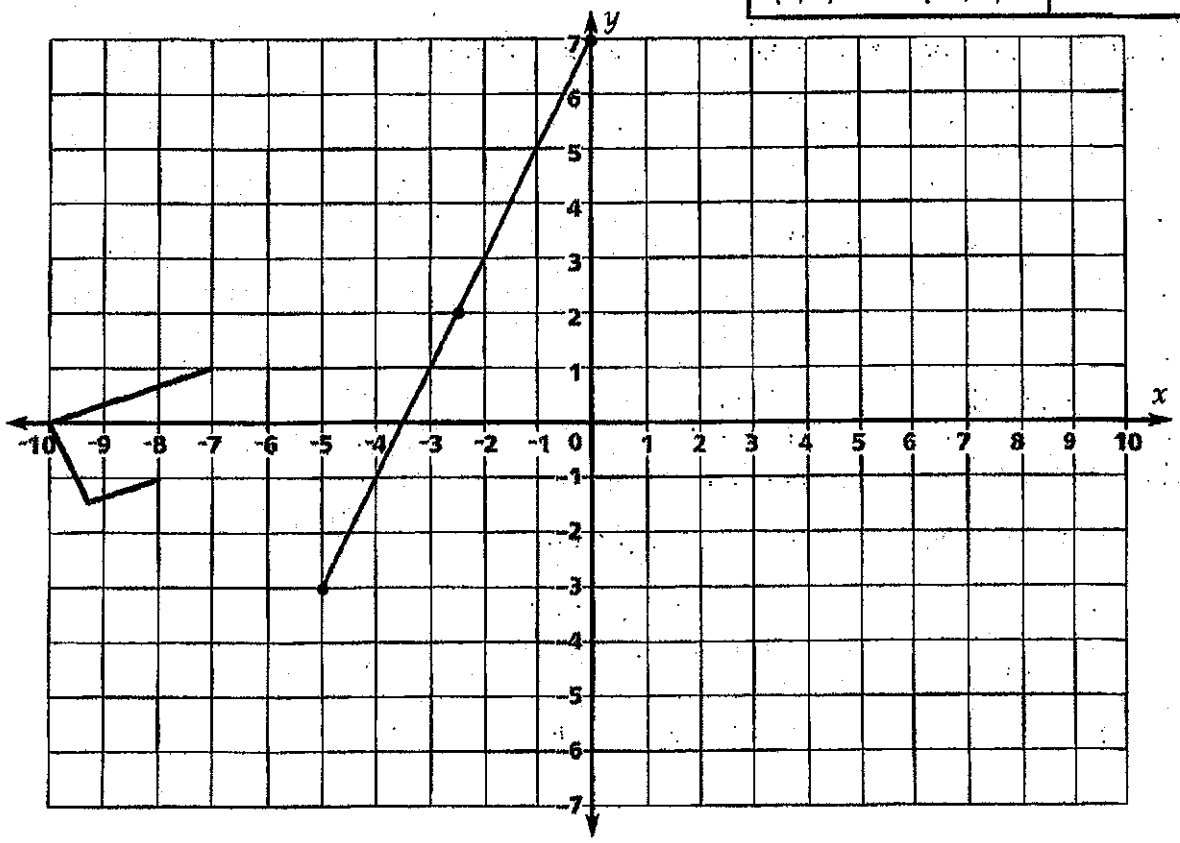
Midpoint = $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Example: Find the midpoint between (-5, -3) and (0, 7).

$M = \left(\frac{-5+0}{2}, \frac{-3+7}{2}\right) = \left(\frac{-5}{2}, \frac{4}{2}\right) = (-2.5, 2)$

Find the midpoints for these sets of ordered pairs. Then graph each segment formed by the two ordered pairs, checking that the midpoint divides the segment into two congruent segments. You will reveal a mathematical symbol that was introduced in 1525.

	Segment Endpoints	Midpoint
1.	(10, 7) and (10, 5)	
2.	(-1, 1) and (1, 5)	
3.	(-5, -7) and (-8, -1)	
4.	(0, 7) and (10, 7)	
5.	(-1, 1) and (-5, -7)	
6.	(-7, 1) and (-5, -3)	
7.	(1, 5) and (10, 5)	



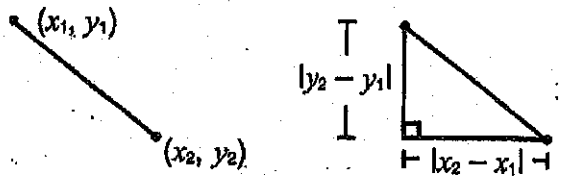
Name _____

The Distance Formula

Remember

To find the distance between two points, use the Distance Formula. It is based on the Pythagorean Theorem.

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

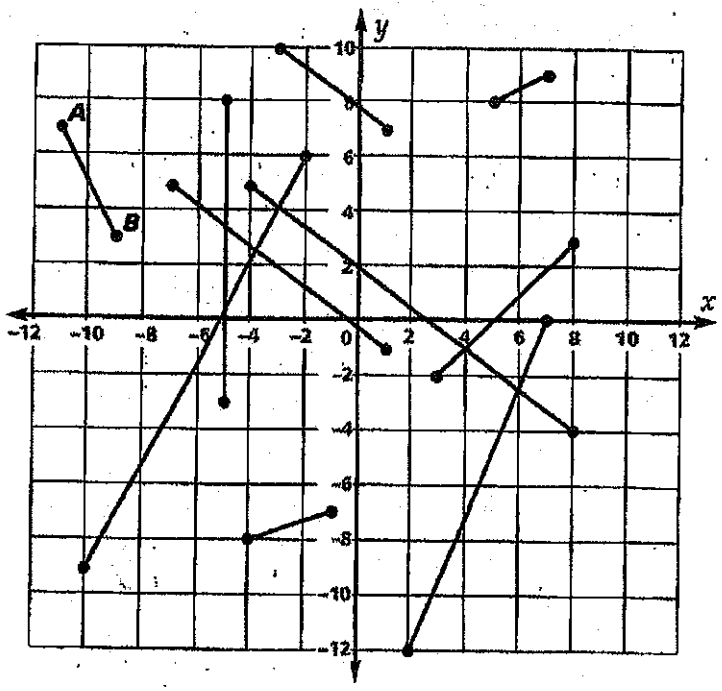


Example: Find the distance between $(-11, 7)$ and $(-9, 3)$. Let $(-11, 7)$ be (x_1, y_1) and $(-9, 3)$ be (x_2, y_2).

$$\begin{aligned} D &= \sqrt{(-9 - -11)^2 + (3 - 7)^2} \\ &= \sqrt{(2)^2 + (-4)^2} \\ &= \sqrt{4 + 16} \\ &= \sqrt{20} \\ &= \sqrt{4 \cdot 5} \\ &= 2\sqrt{5} \text{ units} \end{aligned}$$

Label each pair of points on the graph and find the distance between them. Use your answers and the decoder to find the distance from the center of the pitcher's mound to home plate in baseball.

1. **A** (-11, 7) and **B** (-9, 3) $2\sqrt{5}$
2. **C** (-5, -3) and **D** (-5, 8) _____
3. **E** (-7, 5) and **F** (1, -1) _____
4. **G** (8, 3) and **H** (3, -2) _____
5. **I** (-3, 10) and **J** (1, 7) _____
6. **K** (-10, -9) and **L** (-2, 6) _____
7. **M** (7, 9) and **N** (5, 8) _____
8. **O** (2, -12) and **P** (7, 0) _____
9. **Q** (-4, 5) and **R** (8, -4) _____
10. **S** (-1, -7) and **T** (-4, -8) _____



$\sqrt{5}$	10	$2\sqrt{5}$	5	17	$5\sqrt{2}$	$\sqrt{10}$	13	15	11
C	E	F	H	I	N	S	T	X	Y

_____ F _____ ,
10 6 9 8 2 . 1 3 3 8

_____ _____
10 6 9 6 4 7 5 3 10