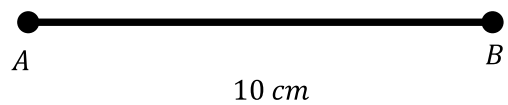
Section 1 – Topic 3
Midpoint and Distance in the Coordinate Plane – Part 1

Consider the line segment displayed below.



The length of $\overline{AB}$ is _____ centimeters.

- _____ is an amount of space (in certain units) between two points in a _____.

Draw a point halfway between point A and point B. Label this point C.

What is the length of $\overline{AC}$?

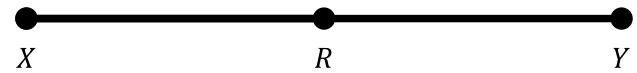
What is the length of $\overline{CB}$?

Point C is called the _____ of $\overline{AB}$.

Why do you think it's called the midpoint?

Let's Practice!

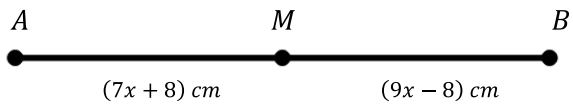
1. Consider $\overline{XY}$ with midpoint R.



   a. What can be said of $\overline{XR}$ and $\overline{RY}$?

   b. If the length of $\overline{XR}$ is represented by $(2x + 5)\ in$ and the length of $\overline{RY}$ is $22\ in$, what is the value of x?

2. Consider the line segment below.



a. If the length of $\overline{AB}$ is 128 cm, what is x?

b. What is the length of $\overline{AM}$?

c. What is the length of $\overline{BM}$?

d. Is point M the midpoint of $\overline{AB}$? Justify your answer.

Try It!

3. Diego lives in a city and Anya lives in another city. Their houses are 72 miles apart. They both meet at their favorite restaurant, which is $(16x - 3)$ miles from Diego's house and $(5x + 2)$ miles from Anya's house.

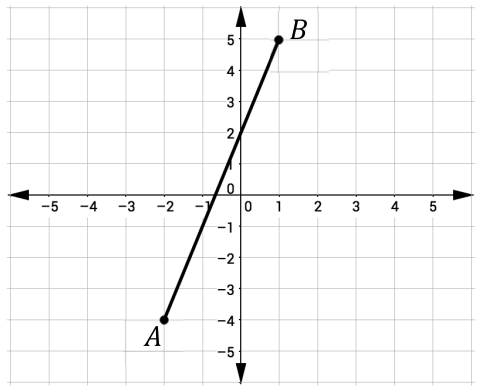
   Diego argues that in a straight line distance, the restaurant is halfway between his house and Anya's house. Is Diego right? Justify your reasoning.

Midpoint and ***distance*** can also be calculated on a coordinate plane.

The coordinate plane is a plane that is divided into _____ regions (called quadrants) by a horizontal line (_____) and a vertical line (_____).

- The location, or coordinates, of a point are given by an ordered pair, _____.

Consider the following graph.



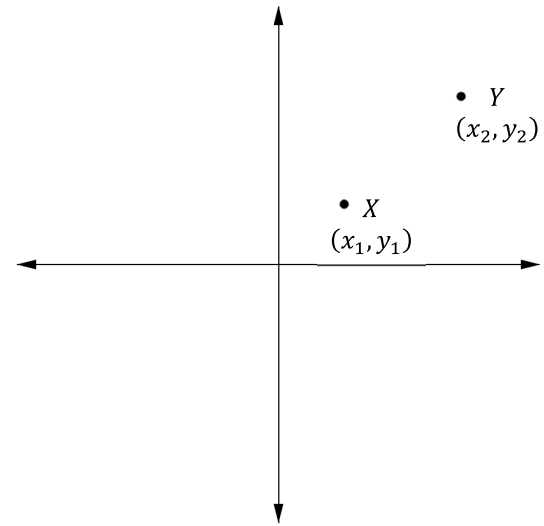
Name the ordered pair that represents point A.

Name the ordered pair that represents point B.

How can we find the midpoint of this line?

The midpoint of $\overline{AB}$ is (_____ , _____).

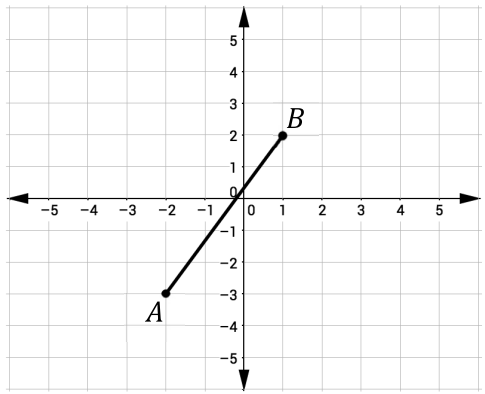
Let's consider points X and Y on the coordinate plane below.



Write a formula that can be used to find the midpoint of any two given points.

Let's Practice!

4. Consider the line segment in the graph below.



Find the midpoint of $\overline{AB}$.

5. M is the midpoint of $\overline{CD}$. C has coordinates $(-1,-1)$ and M has coordinates $(3,5)$. Find the coordinates of D.

Try It!

6. P has coordinates $(2,4)$. Q has coordinates $(-10,12)$. Find the midpoint of $\overline{PQ}$.

7. *Café 103* is equidistant and collinear from *Metrics School* and *Angles Lab*. The *Metrics School* is located at point $(4,6)$ on a coordinate plane, and *Café 103* is at point $(7,2)$. Find the coordinates of *Angles Lab*.