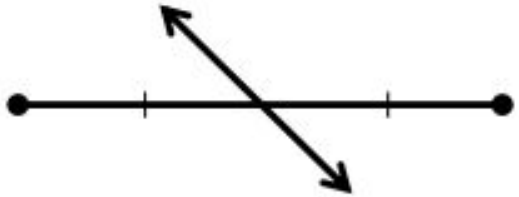
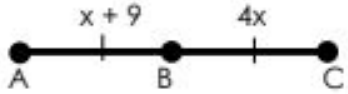
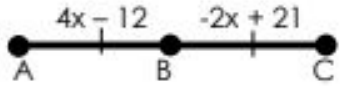
A **Segment Bisector** is a point, ray, line, line segment, or plane that intersects the segment at it's midpoint.



Example 1:



Example 2:

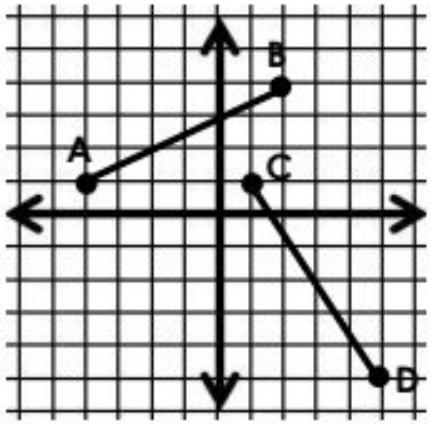


The **Midpoint** of a segment divides a segment into two congruent segments

The 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:

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



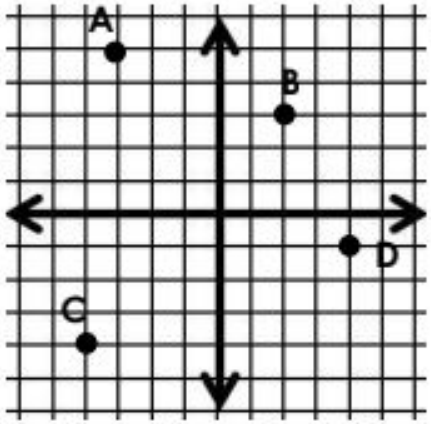
Example 3: Find the midpoint of $\overline{AB}$.

Example 4: Find the midpoint of $\overline{CD}$.

The 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:

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

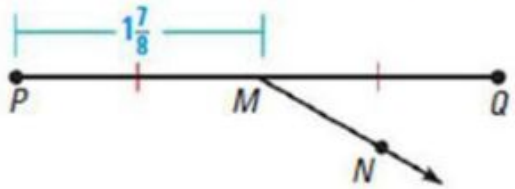


Example 5: Find the distance between A and B.

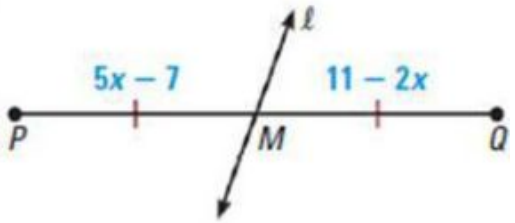
Example 6: Find the distance between C and D.

In Exercises 1 and 2, identify the segment bisector of $\overline{PQ}$. Then find PQ.

1.



2.



Example 1:
Find the distance between (-3,1) and (2,3).

Example 2:
Find the distance between (-2,1) and (2,5).

Example 3: Find the midpoint of the line segment with endpoints (-3, -1) and (7, -5).

Example 4: Find the midpoint of the line segment with endpoints (6, -3) and (4, -7).