## Lesson 1.7 Midpoint and Distance in the Coordinate Plane



Ex. midpoint of segment $A B=$


Ex. midpoint of segment $\mathrm{EF}=$


2 What is the midpoint of segment RS with endpoints $R$ $(5,-10)$ and $S(3,6)$ ?

## Key Concept Midpoint Formulas

Description
Formula
Diagram
On a Number Line
The coordinate of the
midpoint is the average or mean of the coordinates of the endpoints.

In the Coordinate Plane
The coordinates of the midpoint are the average of the $x$-coordinates and the average of the $y$-coordinates of the endpoints.

The coordinate of the midpoint M of $\overline{A B}$ is $\frac{a+b}{2}$.


Given $\overline{A B}$ where $A\left(x_{1}, y_{1}\right)$ and $B\left(x_{2}, y_{2}\right)$, the coordinates of the midpoint of $\overline{A B}$ are $M\left(\frac{x_{1}+x_{2}}{2}, \frac{y_{1}+y_{2}}{2}\right)$.


1 Segment JK has endpoints at -12 and 4 on a number line. What is the midpoint?

The midpoint of $\overline{C D}$ is $M(-2,1)$. One endpoint is $C(-5,7)$. What are the coordinates of the other endpoint $D$ ?


3 The midpoint of segment $A B$ has coordinates (4, -9).
Endpoint A has coordinates ( $-3,-5$ ). What are the coordinates of $B$ ?

Ex. Find the distance between $(-4,5)$ and $(3,7)$.

The distance between two points on a coordinate plane can be found by: $d=\sqrt{\left(x_{2}-x_{1}\right)^{2}+\left(y_{2}-y_{1}\right)^{2}}$.


4 What is the distance from $S(-2,14)$ to $R(3,-1)$ ? (Round to the nearest tenth)

## Ex. On a zip-line course, you are harnessed to a cable

 that travels through the treetops. You start at Platform A and zip to each of the other platforms. How far do you travel from Platform B to Platform $C$ ? Each grid unit represents 5 m .

