1-7 Midpoint and Distance in the Coordinate Plane

take note

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.	The coordinate of the midpoint M of $\overline{AB}$ is $\frac{a+b}{2}$.	
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.	Given $\overline{AB}$ where $A(x_1, y_1)$ and $B(x_2, y_2)$, the coordinates of the midpoint of $\overline{AB}$ are $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.	
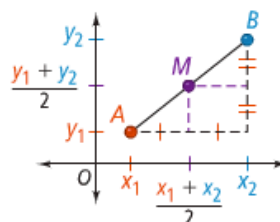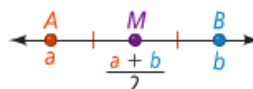
© **Problem 1**   Finding the Midpoint

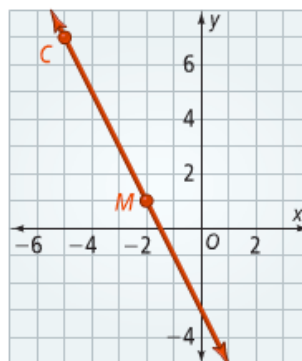**A** $\overline{AB}$ has endpoints at -4 and 9. What is the coordinate of its midpoint?
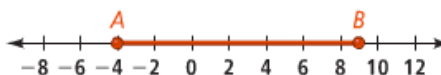
B $\overline{EF}$ has endpoints $E(7, 5)$ and $F(2, -4)$. What are the coordinates of its midpoint M?
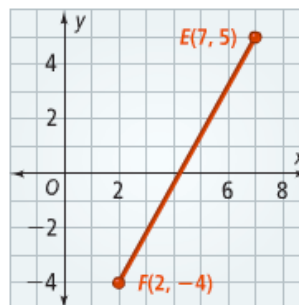
Problem 2   **Finding an Endpoint**

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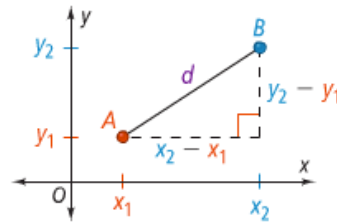What are the coordinates of the other endpoint D?

take note

Key Concept   Distance Formula

The distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is

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

Ⓒ **Problem 3**   **Finding Distance**

What is the distance between $U(-7, 5)$ and $V(4, -3)$? Round to the nearest tenth.

Lesson Check

Do you know HOW?

1. $\overline{RS}$ has endpoints $R(2, 4)$ and $S(-1, 7)$. What are the coordinates of its midpoint M?

2. The midpoint of $\overline{BC}$ is $(5, -2)$. One endpoint is $B(3, 4)$. What are the coordinates of endpoint C?

3. What is the distance between points $K(-9, 8)$ and $L(-6, 0)$?