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 $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.	
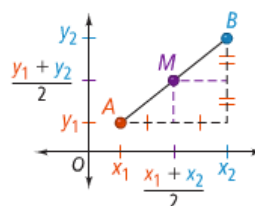
Problem 1 Finding the Midpoint

A $\overline{AB}$ has endpoints at -4 and 9. What is the coordinate of its midpoint?
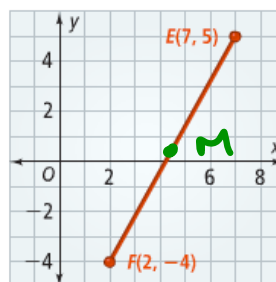
$$\frac{-4+9}{2} = \frac{5}{2} = 2.5$$
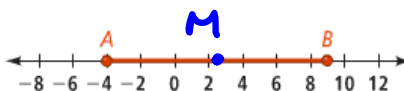
B $\overline{EF}$ has endpoints $E(7, 5)$ and $F(2, -4)$. What are the coordinates of its midpoint M?

$$\left(\frac{7+2}{2}, \frac{5+-4}{2}\right)$$

$$\left(\frac{9}{2}, \frac{1}{2}\right)$$

$$(4.5, .5)$$

© **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?

$D(x, y)$

$(1, 5)$

$2 \cdot \dfrac{-5+x}{2} = -2 \cdot 2$

$-5 + x = -4$

$x = 1$

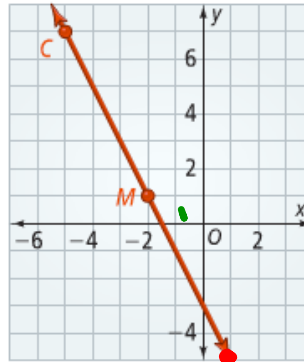$2 \cdot \dfrac{7+y}{2} = 1 \cdot 2$
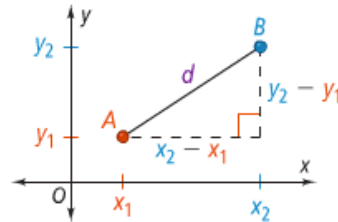
$7 + y = 2$

$y = -5$

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.

$d = \sqrt{(-7-4)^2 + (5 - -3)^2}$

$d = \sqrt{(-11)^2 + (8)^2}$ ⟵   A

$d = \sqrt{121 + 64}$

$d = \sqrt{185}$

$d = 13.6$

Name

1.7

pg. 54-55 # 6-30 even,
        36-44 even,
        48-50
        62-64

Notes 1.8