

- Please take out 9.2 Notes and your Formula Sheet
- On the back and at the top, write: **9.3 Notes—Midpoint Formula & Partitioning a Segment**
- **if you do not have your 9.2 notes, take out a separate piece of paper

Midpoint formula

- This is NOT on your formula sheet so you need to remember...

- Midpoint Formula: $(m_x, m_y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

- Example: Find the midpoint of the segments

- A (4, 6) & B (-3, 4)

$$\begin{matrix} x_1, y_1 & x_2, y_2 \\ (4, 6) & (-3, 4) \end{matrix} \quad \left(\frac{4 + (-3)}{2}, \frac{6 + 4}{2} \right) = \left(\frac{1}{2}, 5 \right)$$

- C (-2, 5) & D (4, -6)

$$\begin{matrix} x_1, y_1 & x_2, y_2 \\ (-2, 5) & (4, -6) \end{matrix} \quad \left(\frac{-2 + 4}{2}, \frac{5 + (-6)}{2} \right) = \left(1, -\frac{1}{2} \right)$$

Missing endpoint (work backwards)

- Find the missing endpoint of the segment if the midpoint is $(3, 5)$

1. A(4, 11)

$$(2, -1)$$

$$2. \quad 3 = \frac{4+x}{2} \cdot 2$$

$$\begin{array}{r} 6 = 4+x \\ -4 \quad -4 \\ \hline 2 = x \end{array}$$

$$.2 \quad 5 = \frac{11+y}{2} \cdot 2$$

$$\begin{array}{r} 10 = 11+y \\ -11 \quad -11 \\ \hline -1 = y \end{array}$$

2. B(-5, -4)

$$(11, 14)$$

$$.2 \quad 3 = \frac{-5+x}{2} \cdot 2$$

$$\begin{array}{r} 6 = -5+x \\ +5 \quad +5 \\ \hline 11 = x \end{array}$$

$$.2 \quad 5 = \frac{-4+y}{2} \cdot 2$$

$$\begin{array}{r} 10 = -4+y \\ +4 \quad +4 \\ \hline 14 = y \end{array}$$

Partitioning a Segment

- This IS on your formula sheet.
- Formula for partitioning a segment:

$$(x, y) = \left(x_1 + \frac{a}{a+b}(x_2 - x_1), y_1 + \frac{a}{a+b}(y_2 - y_1) \right)$$

- Example: Partition each segment by the given ratio:

1. $(-14, 3)$ & $(10, -4)$; 1:2 $(-6, .67)$ 2. $(-6, -5)$ & $(7, 8)$; 2:3

$$\left(-14 + \frac{1}{1+2}(10 - (-14)), 3 + \frac{1}{1+2}(-4 - 3) \right)$$

$$-14 + \frac{1}{3}(24)$$

$$-14 + 8 = -6$$

$$3 + \frac{1}{3}(-7)$$

$$3 - 2.33 = .67$$