

## Midpoint Formula

Sheet 3

**Example:** The endpoints of the line segment are  $(-1, 2)$  and  $(7, u)$ ; the midpoint is  $(3, -5)$ . Find the value of the unknown.

$$\text{Midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \Rightarrow (3, -5) = \left( \frac{-1+7}{2}, \frac{2+u}{2} \right)$$

$$\Rightarrow 3 = \left( \frac{-1+7}{2} \right), -5 = \left( \frac{2+u}{2} \right) \Rightarrow -10 = 2+u$$

$$\mathbf{u = -12}$$

The endpoints and the

the value of the unknown.

- 1) Endpoints :  $(9, t), (q, -9)$   
Midpoint :  $(u, 6)$

$(6, p)$   
 $(2, 5)$

$$t = \underline{\hspace{2cm}}, u = \underline{\hspace{2cm}}$$

$$q = \underline{\hspace{2cm}}$$

- 3) Endpoints :  $(m, -3), (12, 5)$   
Midpoint :  $(-7, -1)$

$(h, 7)$   
 $(3, 6)$

$$m = \underline{\hspace{2cm}}$$

- 5) Endpoints :  $(-6, -9), (1, 12)$   
Midpoint :  $(3, y)$

$(d, 7)$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$

$$c = \underline{\hspace{2cm}}, d = \underline{\hspace{2cm}}$$

- 7) Endpoints :  $(8, -12), (6, -n)$   
Midpoint :  $(7, -10)$

- 8) Endpoints :  $(-5, z), (3, -9)$   
Midpoint :  $(-1, -11)$

$$n = \underline{\hspace{2cm}}$$

$$z = \underline{\hspace{2cm}}$$

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$$\text{Midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \Rightarrow (3, -5) = \left( \frac{-1+7}{2}, \frac{2+u}{2} \right)$$

$$\Rightarrow 3 = \left( \frac{-1+7}{2} \right), -5 = \left( \frac{2+u}{2} \right) \Rightarrow -10 = 2+u$$

$$u = -12$$

The endpoints and the value of the unknown.

1) Endpoints :  $(9, t)$ ,  $(q, -9)$ ,  $(6, p)$   
Midpoint :  $(u, 6)$

$$t = \underline{0}, u = \underline{2.5}$$

3) Endpoints :  $(m, -3)$ ,  $(12, 5)$ ,  $(h, 7)$   
Midpoint :  $(-7, -1)$

$$m = \underline{-15}$$

5) Endpoints :  $(-6, -1)$ ,  $(-9, c)$ ,  $(1, 12)$   
Midpoint :  $(3, y)$

$$x = \underline{12}, y = \underline{4}$$

7) Endpoints :  $(8, -12)$ ,  $(6, -n)$   
Midpoint :  $(7, -10)$

$$n = \underline{8}$$

8) Endpoints :  $(-5, z)$ ,  $(3, -9)$   
Midpoint :  $(-1, -11)$

$$z = \underline{-13}$$

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