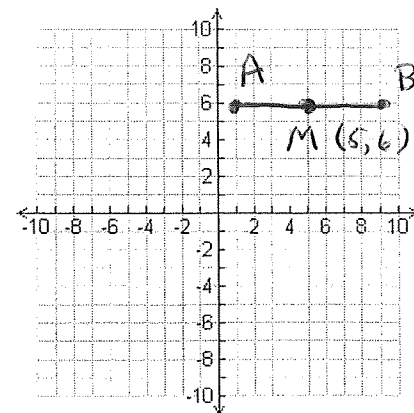


# Midpoint and Distance Worksheet

Key

## Part 1: Graphing

1) Graph the points A (1, 6) and B (9, 6). Find the midpoint of  $\overline{AB}$ . Find the distance of  $\overline{AB}$ .



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

$$MP = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$d = \sqrt{(9-1)^2 + (6-6)^2}$$

$$= \left( \frac{1+9}{2}, \frac{6+6}{2} \right)$$

$$d = \sqrt{(8)^2 + (0)^2}$$

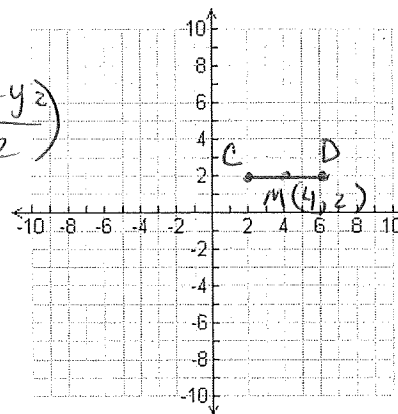
$$= \left( \frac{10}{2}, \frac{12}{2} \right)$$

$$d = \sqrt{8^2 + 0} \quad AB = 8$$

$$= (5, 6)$$

$$d = \sqrt{64} = 8 \text{ units}$$

2) Graph the points C (2, 2) and D (6, 2). Find the midpoint of  $\overline{CD}$ . Find the distance of  $\overline{CD}$ .



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

$$MP = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$d = \sqrt{(6-2)^2 + (2-2)^2}$$

$$CD = 4$$

$$= \left( \frac{2+6}{2}, \frac{2+2}{2} \right)$$

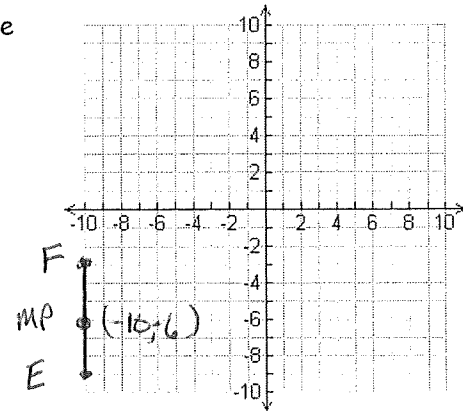
$$= \sqrt{(4)^2 + (0)^2}$$

$$\left( \frac{8}{2}, \frac{4}{2} \right)$$

$$\sqrt{16} = 4 \text{ units}$$

$$(4, 2)$$

3) Graph the points E (-10, -9) and F (-10, -3). Find the midpoint of  $\overline{EF}$ . Find the distance  $\overline{EF}$ .



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

$$MP = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$= \sqrt{(-10+10)^2 + (-3+9)^2}$$

$$= \frac{-10+10}{2}, \frac{-9-3}{2}$$

$$= \sqrt{0^2 + 6^2}$$

$$= \frac{-20}{2}, \frac{-12}{2}$$

$$= \sqrt{36}$$

$$= (-10, -6)$$

$$= 6 \text{ units}$$

$$EF = 6$$

### Part 2: Midpoint Using Formula Only

Find the midpoint for each line segment using the formula (no graphing needed). Show the formula and all work.

4) G(6, 5) and H(9, 2)  
 $x_1$   $y_1$     $x_2$   $y_2$     $\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

$$\left( \frac{6+9}{2}, \frac{5+2}{2} \right)$$

$$\left( \frac{15}{2}, \frac{7}{2} \right)$$

5) I(1, 1) and J(-3, -3)  
 $x_1$   $y_1$     $x_2$   $y_2$     $(7.5, 3.5)$

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

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

6) K(1, -1) and L(8, -7)

$$\left( \frac{1+8}{2}, \frac{-1-7}{2} \right)$$

$$\left( \frac{9}{2}, \frac{-8}{2} \right)$$

$$(4.5, -4)$$

### Part 3: Distance Using Formula Only

Find the distance between each set of points (round to 2 dp if needed, no graphing needed). Show the formula and all work.

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

7) (0, 0) and (4, 3)

$$x_1 \ y_1 \quad x_2 \ y_2$$

$$d = \sqrt{(4-0)^2 + (3-0)^2}$$

$$d = \sqrt{4^2 + 3^2}$$

$$d = \sqrt{16 + 9}$$

$$d = \sqrt{25}$$

$$d = 5$$

8) (3, -3) and (2, 7)

$$x_1 \ y_1 \quad x_2 \ y_2$$

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

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

$$d = \sqrt{(-1)^2 + (10)^2}$$

$$d = \sqrt{1 + 100}$$

$$d = \sqrt{101}$$

$$d = 10.05$$

9) Determine the coordinates of the points needed. Then find the distance of each line segment (round to 2 dp):

a) GH  $G(8, 6)$   $H(1, 8)$

$$d = \sqrt{(1-8)^2 + (8-6)^2}$$

$$d = \sqrt{49 + 4}$$

$$d = \sqrt{53}$$

$H(1, 8)$

$$d = \sqrt{85}$$

$$d = 9.2$$

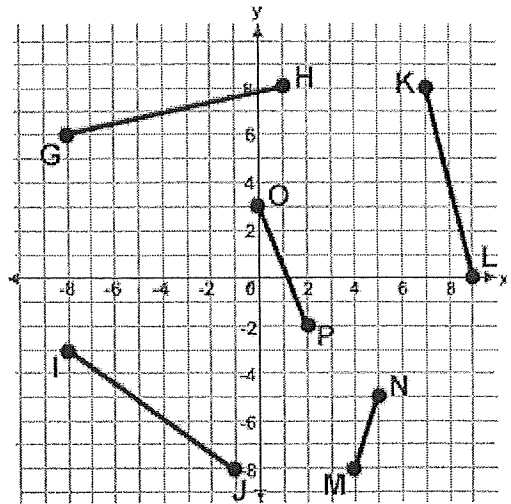
b) KL  $K(7, 8)$   $L(9, 0)$

$$d = \sqrt{(9-7)^2 + (0-8)^2}$$

$$d = \sqrt{68}$$

$$d = \sqrt{4 + 64}$$

$$d = 8.25$$



Part 4: Putting it All Together

10) Triangle ABC has coordinates A (3, 9), B (5, 1) and C (9, 5). D is the midpoint of AB and E is the midpoint of AC.

a) Graph the points A, B, and C (make sure you label them). Find the coordinates of points D and E. Show all work.

$$\left(\frac{3+5}{2}, \frac{9+1}{2}\right)$$

$$\left(\frac{8}{2}, \frac{10}{2}\right)$$

$$D = (4, 5)$$

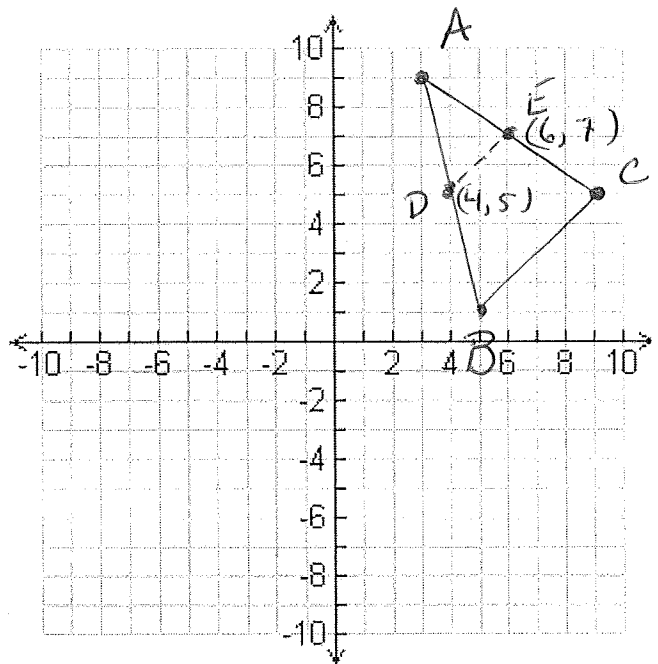
$$\left(\frac{3+9}{2}, \frac{9+5}{2}\right)$$

$$\left(\frac{12}{2}, \frac{14}{2}\right)$$

$$E = (6, 7)$$

b) Plot points D and point E on the graph and label.

$$\begin{matrix} (4, 5) & (6, 7) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$



c) Find the length of DE. Show all work.

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

$$d = \sqrt{(6-4)^2 + (7-5)^2}$$

$$d = \sqrt{2^2 + 2^2}$$

$$d = \sqrt{4+4}$$

$$d = \sqrt{8}$$

$$d = 2.83$$