

# 1.3 - Distance and Midpoints

## Goals Aligned to Common Core State Standards:

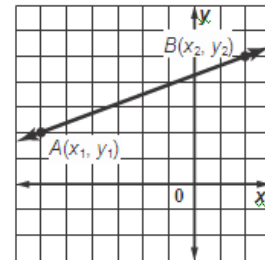
- You will find the midpoint on a line segment and the distance between two points.
- You will construct a line that bisects a segment to find the midpoint of a given segment.
- MP 1, 3, 4, 6, 8

## Distance

- Length** or **Measure** of two endpoints
- The distance from A to B is the same distance as B to A.

Distance Formula on a coordinate plane

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



Use the Distance Formula to find the distance between the pair of points.

1. A(-3,1), B(2,3)

$$\begin{aligned} &\sqrt{(-3-2)^2 + (1-3)^2} \\ &\sqrt{(-5)^2 + (-2)^2} \\ &\sqrt{25 + 4} \\ &\sqrt{29} \end{aligned}$$

2. M(-2, 1), N(2, 5)

$$\begin{aligned} &\sqrt{(-2-2)^2 + (1-5)^2} \\ &\sqrt{16 + 16} \\ &\sqrt{32} \\ &\sqrt{16} \sqrt{2} \\ &\textcircled{4\sqrt{2}} \end{aligned}$$



- The **midpoint** of a segment is The point in the middle of the 2 endpoints  
The ratio of a midpoint is: 1:2 or 1/2
- Segment **Bisector**: cuts a segment into 2  $\cong$  parts

Midpoint (coordinate plane)
$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Why does the midpoint formula divide by 2?

**Find the coordinates of the midpoint of a segment having the given endpoints.**

7. R(-3, -1), S(7, -5)

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

$$\left(\frac{4}{2}, \frac{-6}{2}\right)$$

$$(2, -3)$$

8. P(6, -3), Q(4, -7)

$$\left(\frac{6+4}{2}, \frac{-3+(-7)}{2}\right)$$

$$(5, -5)$$

**Simplify Radicals**

1.)  $\sqrt{20}$

$$\sqrt{4} \sqrt{5}$$

$$2 \sqrt{5}$$

$$5 \uparrow 4$$

$$2 \uparrow 2$$

$$\sqrt{2^2} \sqrt{5}$$

$$2 \sqrt{5}$$

2.)  $\sqrt{30}$

$$6 \uparrow 5$$

$$3 \uparrow 2$$

3.)  $\sqrt{40}$

$$\sqrt{4} \sqrt{10}$$

$$2 \sqrt{10}$$

$$8 \uparrow 5$$

$$4 \uparrow 2$$

$$2 \uparrow 2$$

$$\sqrt{2^2} \sqrt{10}$$

$$2 \sqrt{10}$$

4.)  $\sqrt{72}$

$$\sqrt{36} \sqrt{2}$$

$$6 \sqrt{2}$$

$$9 \uparrow 8$$

$$3 \uparrow 3 \uparrow 4 \uparrow 2$$

$$2 \uparrow 2$$

$$\sqrt{3^2 \cdot 2^2} \sqrt{2}$$

$$3 \cdot 2 \sqrt{2}$$

$$6 \sqrt{2}$$

$$\sqrt{9} \sqrt{8}$$

$$3 \sqrt{8}$$

$$3 \sqrt{4 \cdot 2}$$

$$3 \cdot 2 \sqrt{2}$$

$$6 \sqrt{2}$$

**Construct a segment bisector pg. 30**

### **Goals Aligned to Common Core State Standards:**

- You can find the midpoint on a line segment and the distance between two points.
- You can construct a line that bisects a segment to find the midpoint of a given segment.

### **Homework:**

**Distance & Midpoint Task Wkst**

**Pg. P20 (lesson 0-9) #1-6**

**Pg. 31 # 32, 53, 55, 66a**

### **Challenge +2 ec points**

**Given  $A(3,2)$  and  $B(6,11)$ , find the point that divides the line segment  $AB$  two-thirds of the way from  $A$  to  $B$ .**

**Johnny has 20 chocolate bars. He eats 18 of them.  
What does Johnny have now?**

**A serious problem.**