

# **SECTION 1 - 2**

**Measuring Segments**

# OBJECTIVE:

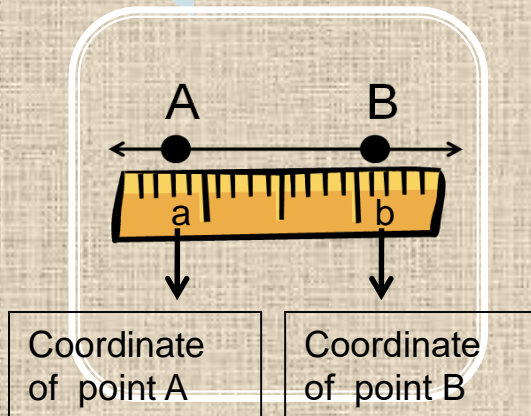


to find and apply the lengths and midpoints of segments

## Postulate 1-2-1 Ruler Postulate

Every point on a line can be paired with a real number. This makes a one-to-one correspondence between the points on the line and the real numbers.

The real number that corresponds to a point is called the coordinate of the point.



# VOCABULARY

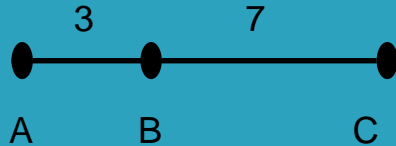
Distance  
between points:  
absolute value  
of the  
difference of  
their  
coordinates

- ▶ Notation:  $AB$
- ▶ Reads as “the measure of line segment  $AB$ ”
- ▶  $AB = |2 - 5|$   
 $AB = |-3|$   
 $AB = 3$



Postulate 1-2-2  
Segment Addition  
Postulate

If three points A, B, and C are collinear, and B is **between** A and C, then  $AB + BC = AC$



$$AB + BC = AC$$
$$3 + 7 = AC$$
$$AC = 10$$

# VOCABULARY

Congruent segments:  
two line segments  
that have the same  
length



When two line  
segments are  
congruent, they have  
the same length.

$$\overline{PQ} \cong \overline{RS}$$

$$PQ = RS$$



# VOCABULARY

Midpoint:

point that divides a segment into 2 congruent segments (equal halves)

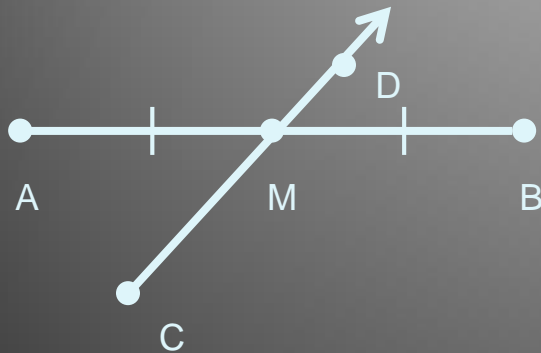


Because  $\overline{AM} \cong \overline{MB}$ ,  
Point  $M$  is the  
midpoint of  $\overline{AB}$ .

# VOCABULARY

Segment bisector:

A point, line, ray or other segment that intersects a segment at its midpoint



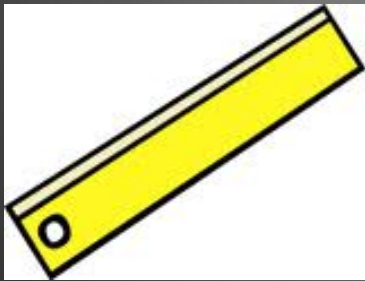
Because  $\overrightarrow{CD}$  intersects  $\overline{AB}$  at its midpoint (point  $M$ ),  $\overrightarrow{CD}$  is the segment bisector of  $\overline{AB}$ .



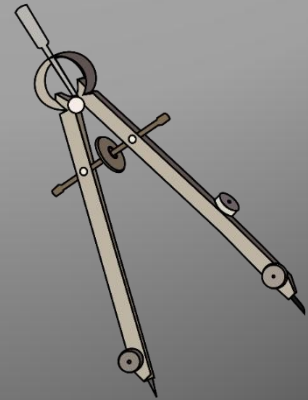
# VOCABULARY

Construction:

a Geometric drawing that uses only a compass and straightedge.

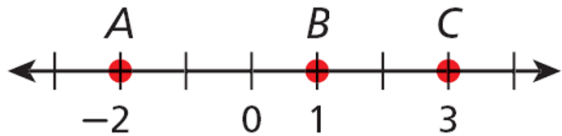


The straightedge allows you to draw straight lines. The compass allows you to draw circular arcs, with all points on an arc the same distance from the point of the compass.



# PRACTICE PROBLEMS

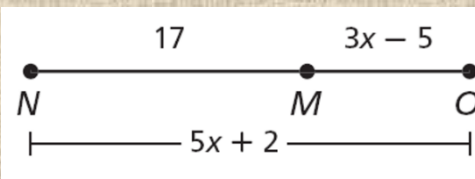
1) Find each length.



a) BC   b) AC

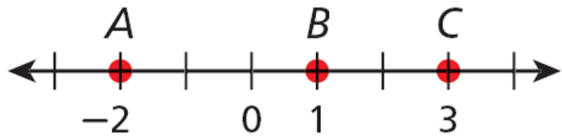
2)  $G$  is between  $F$  and  $H$ .  $FG = 6$ , and  $FH = 11$ . Find  $GH$ .

3)  $M$  is between  $N$  and  $O$ . Find  $NO$ .



# PRACTICE PROBLEMS

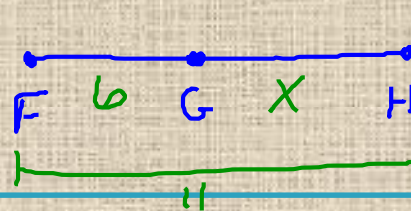
1) Find each length.



a) BC    b) AC

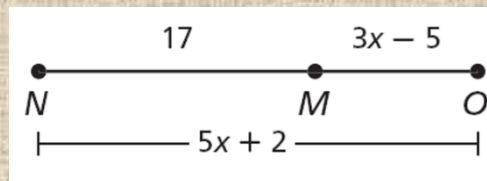
$$\begin{array}{cc} |1-3| & |3+2| \\ |1-2| & |5| \\ 2 & 5 \end{array}$$

2)  $G$  is between  $F$  and  $H$ .  $FG = 6$ , and  $FH = 11$ . Find  $GH$ .



$$\begin{array}{l} FG + GH = FH \\ 6 + x = 11 \\ x = 5 \end{array}$$

3)  $M$  is between  $N$  and  $O$ . Find  $NO$ .



$$NO = 5(5) + 2 = 27$$

$$\begin{array}{l} NM + MO = NO \\ 17 + 3x - 5 = 5x + 2 \\ 12 + 3x = 5x + 2 \\ 10 = 2x \\ 5 = x \end{array}$$

# PRACTICE PROBLEMS

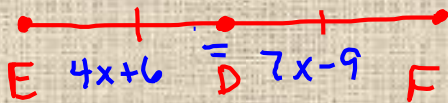
4) Point  $D$  is the midpoint of  $\overline{EF}$ .  $ED = 4x + 6$ , and  $DF = 7x - 9$ . Find  $ED$ ,  $DF$ , and  $EF$ .

5) The map shows the route for a 3 mile race. You are at the starting point  $X$ , 6000 feet from the first checkpoint  $C$ . The second checkpoint  $D$  is located at the midpoint between  $C$  and the end of the race  $Y$ . How far apart are the 2 checkpoints?



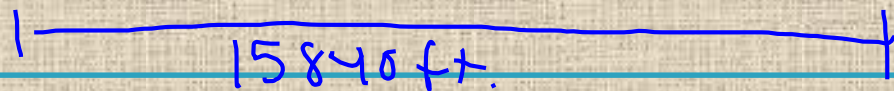
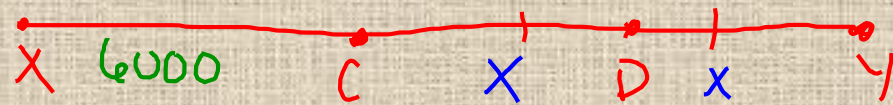
# PRACTICE PROBLEMS

- 4) Point  $D$  is the midpoint of  $\overline{EF}$ .  $ED = 4x + 6$ , and  $DF = 7x - 9$ . Find  $ED$ ,  $DF$ , and  $EF$ .



$$\begin{aligned} ED &= DF \\ 4x + 6 &= 7x - 9 \\ 15 &= 3x \\ 5 &= x \end{aligned}$$
$$\begin{aligned} ED &= 4(5) + 6 = 26 \\ DF &= 26 \\ EF &= 52 \end{aligned}$$

- 5) The map shows the route for a 3 mile race. You are at the starting point  $X$ , 6000 feet from the first checkpoint  $C$ . The second checkpoint  $D$  is located at the midpoint between  $C$  and the end of the race  $Y$ . How far apart are the 2 checkpoints?



$$6000 + x + x = 15840$$

$$\begin{aligned} 2x &= 9840 \\ x &= 4920 \text{ ft} \end{aligned}$$

# SUMMARY

- 1) The length of a line segment is the absolute value of the difference of the endpoint coordinates.  $|a - b|$
- 2) When a line segment is cut into pieces, the sum of the pieces is equal to the length of the line segment.  
 $AB + BC = AC$
- 3) Congruent line segments have equal measures.



# LEARNING RUBRIC

- ▶ Got It: Represents and applies to complex/real world situations
- ▶ Almost There: Represent/apply segment addition/congruence
- ▶ Moving Forward: Apply segment addition/congruence with diagram
- ▶ Getting Started: Find measures on a number line
- ▶ Prior Knowledge: Names segments

# HOMework

- ▶ Pages 17–19: 12–18 even; 26, 28, 32, 36, 38, 40