Lesson 1.02 Rays, Segments, & Congruency

Students will be able to:

- Content Objective: Define ray and congruence and express both using symbolic notation.
- Language Objective: Discuss the relationship between segment addition and congruence.

Warm Up

Draw and label an illustration for each of the following.

a. $\overline{FX}$

b. $\overleftrightarrow{TY}$

Vocabulary Review

Match each term to the correct definition.

1. _____ Plane
2. _____ Line Segment
3. _____ Line
4. _____ Collinear points
5. _____ Point
6. _____ Solid

a. A position in space with zero dimension.

b. Points that lie on the same line.

c. A 3-dimensional figure with length, width, and height.

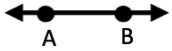
d. A part of a line that contains two endpoints.

e. A one-dimensional figure, made up of a set of points, that extends infinitely in opposite directions.

f. A 2-dimensional flat surface, made up of a set of points, and can be measured by length and width.

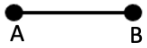
Graphic Organizer

Line
- A one-dimensional figure that extends enlessly in opposite directions.



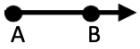
$\overleftrightarrow{AB}$

Line Segment
- A part of a line containing **two endpoints**.



$\overline{AB}$

Ray
- A part of a line that has one endpoint and extends infinitely in the other direction.

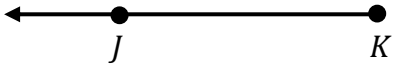


$\overrightarrow{AB}$

Skill 1: Rays & Ray Notation

Complete parts a. and b. using your knowledge of rays.

a. Use symbolic notation to represent the ray shown below.



b. Are $\overrightarrow{RS}$ and $\overleftarrow{RS}$ names for the same ray? Explain.

Exercise 1: Rays & Ray Notation

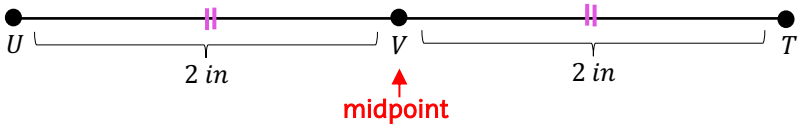
Complete parts a. and b. using your knowledge of rays.

a. Draw the ray that has endpoint C and extends through point D.

b. What is the difference between $\overrightarrow{GH}$ and $\overleftarrow{GH}$? Explain.

Now that we understand lines and rays, let's talk about some important terminology.

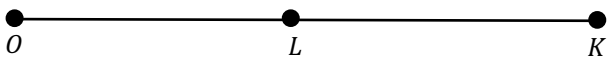
Equality vs. Congruence



Equality	Congruence	Midpoint
Deals with numbers $2\ in = 2\ in$	Deals with shapes $\overline{UV} \cong \overline{VT}$ Congruent segments are marked with the **same hash marks** as shown in the diagram.	A point that divides a segment into two <u>congruent segments</u>.

Skill 2: Congruence & Equality

Consider line segment OK with length 3 inches and point L, the midpoint of $\overline{OK}$

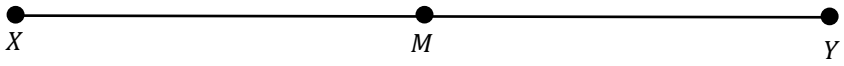


a. What is the length of $\overline{OL}$ and $\overline{LK}$?

b. Write a congruence statement based on part a. and label the diagram using hash marks.

Exercise 2: Congruence & Equality

Consider line segment XY with point M, the midpoint of $\overline{XY}$.



a. If $\overline{XM} = 2.2$ inches, then what is the length of $\overline{XY}$?

b. Write a congruence statement based on part a. and label the diagram using hash marks.

Talk it Out

Points $A, B, C,$ and D are collinear.

a. Measure the lengths of $\overline{AD}$ and $\overline{CB}$. What statement can be made about these segments?

b. **Segment Addition.** Fill in the blanks below using segment notation.

$AD =$ _____ + _____

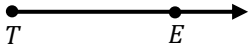
$CB =$ _____ + _____

c. Does this mean that $\overline{AC}$ and $\overline{DB}$ have the same length (measure)? Explain.

We will re-visit how to prove this idea later in the course.

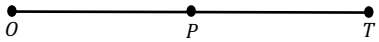
Check Point

1. Circle *all* statements that are not true given $\overleftarrow{ET}$.
   a. The ray that starts at point E and extends through T.
   b. Line segment $\overline{ET}$ is part of $\overleftarrow{ET}$.
   c. $\overleftarrow{ET}$ can be expressed as



   d. $\overleftarrow{ET}$ and $\overrightarrow{ET}$ are names for the same ray.

2. Given line segment $\overline{OT}$ and midpoint P, mark the diagram and fill in the blank with the correct term.



⇒ Length $\overline{OP}$ is _____ to length $\overline{PT}$.

⇒ Segment OP is _____ to segment PT.

Problem Set

Name: _____

1. Draw a picture for each of the following.

   a. The ray that has endpoint M and extends through point N.

   b. $\overrightarrow{HQ}$

   c. $\overleftarrow{HR}$

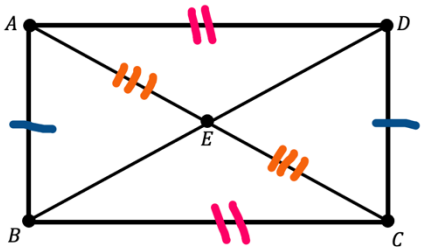
2. Identify whether you would use **equality** or **congruence** to show each of the following scenarios.

   a. 1 dollar has the same value as 4 quarters.

   b. Two wheels on a bicycle have the same shape.

   c. 

3. Given the figure below, list all congruent segments.



4. Jasson wants to visit his friend at the local coffee shop down the street and drives directly East from his house. He stops at a stop sign halfway through his trip.

   a. Draw a line segment that represents this situation. Be sure to label points.

   b. Based on your illustration in part a. which two segments are congruent?

   c. If Jasson's house is 0.82 miles away from the coffee shop, how many miles left does Jasson have to drive once he gets to the stop sign?