Line \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - Part of a line consisting of two endpoints and all points between them.



The diagram above depicts a line segment with endpoints *A* and *B*. A segment is named by its two endpoints in either order with a straight segment drawn over them. This segment could be called either $\\_\\_\\_\\_\\_\\_$ or $\\_\\_\\_\\_\\_\\_\\_$.

Two geometric objects that have the same size and shape are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

In this figure, $\overbar{AB}$ and $\overbar{CD}$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. As shown on the diagram, they both have a length of 5 units.

A congruence statement shows that two segments are congruent. The symbol $\\_\\_\\_\\_\\_\\_\\_$is read “is congruent to.” The congruence statement for the segments above is $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$.



In a diagram, congruent segments are shown with \_\_\_\_\_\_\_\_ marks. The diagram below shows congruent segments indicated by \_\_\_\_\_\_\_\_ marks.

The following properties apply to all congruent segments.

Reflexive Property of Congruence $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

Symmetric Property of Congruence If $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$then $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

Transitive Property of Congruence If $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$and $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$then $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

Example 1 Using Properties of Equality and Congruence

Identify the property that justifies each statement.

a. $\overbar{WX}≅\overbar{YZ}$, so $\overbar{YZ}≅\overbar{WX}$

SOLUTION

b. $\overbar{PQ}≅\overbar{RS}$ and $\overbar{RS}≅\overbar{TU}$, so $\overbar{PQ}≅\overbar{TU}$

SOLUTION

c.$ \overbar{GH}≅\overbar{GH}$

SOLUTION

A ruler can be used to measure the lengths of segments. The points on a ruler correspond with the points on a line segment. This concept is presented in the Ruler Postulate. A postulate is a statement that is accepted as true without proof.

*Postulate 1: Ruler Postulate - The points on a line can be paired in a one-to-one correspondence with the real numbers such that:*

*1. Any two given points can have coordinates 0 and 1.*

*2. The distance between two points is the absolute value of the difference of their coordinates.*

Distance is the measure of the segment connecting two points. The distance between two points can be represented by those two points with no segment symbol. For example, *AB* means “the distance between *A* and *B*.”

Distance is always positive, so absolute values are used to calculate distances.

⎪Point *A* - Point *B*⎥ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The distance from point *A* to point *B* is \_\_\_.



Example 2 Finding Distance on a Number Line

Find each distance.

a. *AB*

SOLUTION

b. *BC*

SOLUTION

c. *CD*

SOLUTION

d. *AC*

SOLUTION

In the example above, notice that *AC* = *AB* + *BC*. This is not a coincidence.

*Postulate 2: Segment Addition Postulate - If B is between A and C, then AB + BC = AC.*

Example 3 Using the Segment Addition Postulate

a. Point *S* lies on $\overbar{RT}$ between *R* and *T*. *RS* = 12 and *RT* = 31. Find *ST*.

SOLUTION



b. Find *AC* in terms of *x*.

SOLUTION

The midpoint of a segment is the point that divides the segment into two congruent parts. If *M* is the midpoint of $\overbar{AB}$, then *\_\_\_\_\_\_\_\_\_\_\_\_\_*.

Example 4 Application: Hiking

A hiker is traveling up a mountain towards the summit. The distance from the base of the mountain to the summit is 2.5 miles, as shown. How far will she have traveled when she reaches the midpoint (*Y* ) of the hike?

SOLUTION

You Try!!!!

a.Identify the property that justifies the statement, $\overbar{KL}≅\overbar{MN}$, so $\overbar{MN}≅\overbar{KL}$

b.Find the distance between the points *A* and *B*.



c. Find *AC* in terms of *x*.



d.The drive from Seattle to San Francisco is 811 miles. How many miles is the midpoint from either city?