Geometry H
1.2 Notes – Use Segments and Congruence

Name: Key
Date: ____________ Period: ____________

LEARNING TARGETS

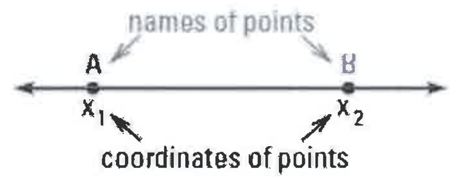
- I can use the Ruler Postulate to find lengths of segments. (CC.9-12.G.CO.1)
- I can use the Segment Addition Postulate to find lengths of segments. (CC.9-12.G.CO.1)
- I can use segment postulates to identify congruent segments. (CC.9-12.G.CO.7)

In Geometry, a rule that is accepted without proof I called a ***postulate*** or an ***axiom.*** A rule that can be proven is called a ***theorem***. Let's start by looking at some geometric postulates.

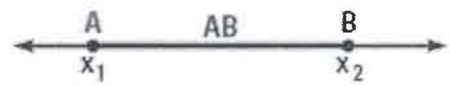
POSTULATE *For Your Notebook*

POSTULATE 1 Ruler Postulate

The points on a line can be matched one to one with the real numbers. The real number that corresponds to a point is the **coordinate** of the point.



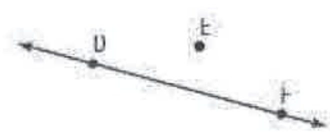
The **distance** between points A and B, written as AB, is the absolute value of the difference of the coordinates of A and B.



The Ruler Postulate is helpful when trying to find lengths of segments. We can find the lengths of segments by looking at the **distance** between two points.

When 3 points are collinear, you can say that one point is **between** the other two.

Point *B* is between points *A* and *C*.



Point *E* is not between points *D* and *F*.

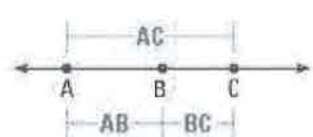
POSTULATE *For Your Notebook*

POSTULATE 2 Segment Addition Postulate

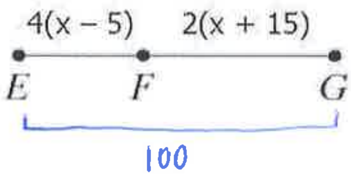
If B is between A and C, then

If $AB + BC = AC$, then B is between A and C.

piece piece whole



Example 1 - On $\overline{EG}$, F is between E and G. If EG = 100, we can find FG.



$4(x-5) + 2(x+15) = 100$

$4x - 20 + 2x + 30 = 100$

$6x + 10 = 100$

$6x = 90$

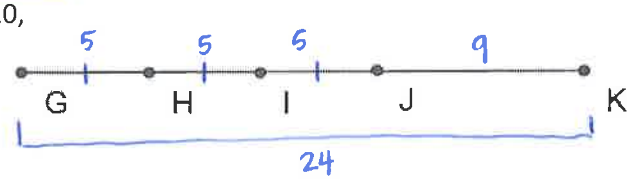
$\boxed{x = 15}$

$FG = 2(15+15)$

$= 2(30)$

$\boxed{FG = 60}$

Example 2 – In the diagram of collinear points, GK = 24 , HJ = 10, and GH = HI = IJ. Find each length :



a.) HI = 5

b.) JK = 9

c.) IJ = 5

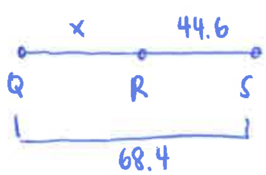
d.) IG = 10

e.) GH = 5

f.) IK = 14

Example 3 – Find a length.

A) R is between Q and S. If RS = 44.6 and SQ = 68.4, find QR.

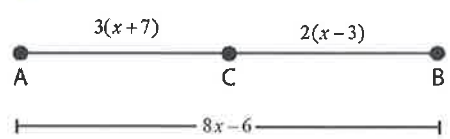


$x + 44.6 = 68.4$

$x = 23.8$

$\boxed{QR = 23.8}$

B) Use the diagram to find AB.



$3(x+7) + 2(x-3) = 8x - 6$

$3x + 21 + 2x - 6 = 8x - 6$

$5x + 15 = 8x - 6$

$15 = 3x - 6$

$21 = 3x$

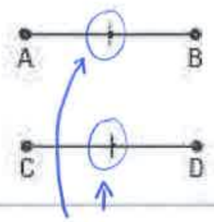
$\boxed{x = 7}$

$AB = 8(7) - 6$

$= 56 - 6$

$\boxed{AB = 50}$

CONGRUENT SEGMENTS Line segments that have the same length are called **congruent segments.** In the diagram below, you can say "the length of $\overline{AB}$ is equal to the length of $\overline{CD}$," or you can say "$\overline{AB}$ *is congruent to* $\overline{CD}$."
The symbol $\cong$ means "is congruent to."



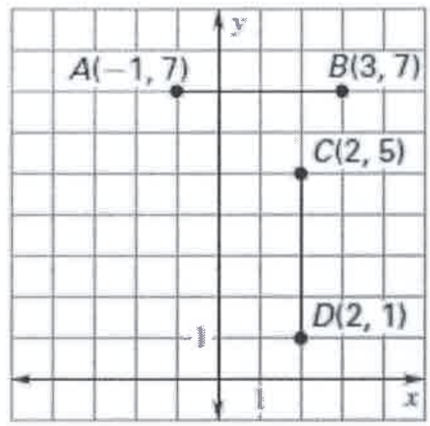
Lengths are equal.	Segments are congruent.
$=$	$\cong$
"is equal to"	"is congruent to"

so $\overline{AB} \cong \overline{CD}$

tick marks mean same length

Example 4 – Compare segments for congruence

Use the diagram to determine whether $\overline{AB}$ and $\overline{CD}$ are congruent.



- To find length of a horizontal segment, you can subtract the x-coordinates.

$AB = 4$

- To find the length of a vertical segment, you can subtract the y-coordinates.

$CD = 4$

$\overline{AB} \cong \overline{CD}$