1.2 Segments and Their Measures

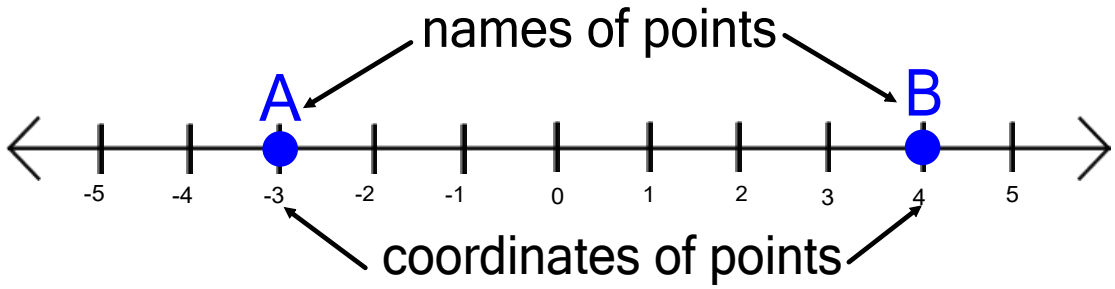
In geometry, rules that are accepted without proof are called postulates.

Postulate 1: Ruler Postulate

The points on a line can be matched with a real number. 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 between the coordinates.

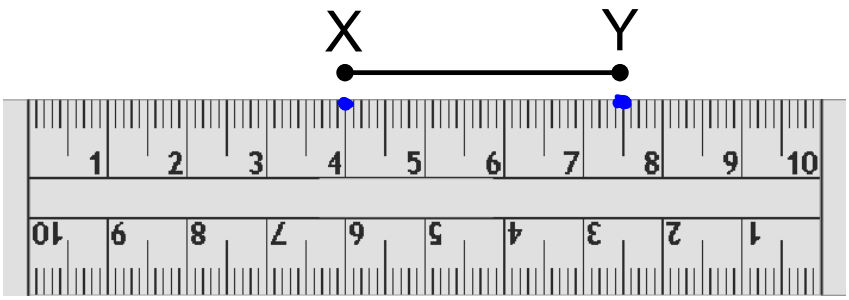
AB is also called the length of $\overleftrightarrow{AB}$.



distance from A to B

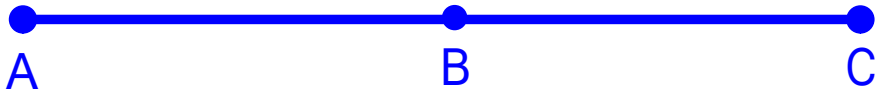
$|4 - (-3)| = |7| = 7$ $|-3 - 4| = |-7| = 7$

Example 1: What is the length of $\overline{XY}$?



$XY = 3.5$

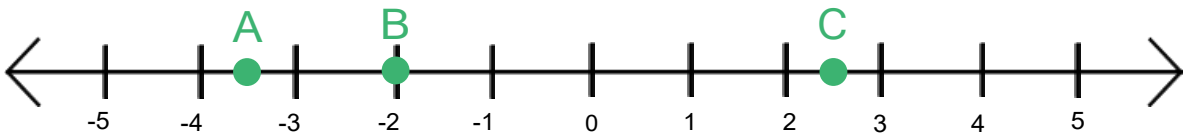
When 3 points lie on a line,
one of them is between the other two.



B is between A and C.

Example 2

Find AB, BC, and AC on the number line shown below.



AB = 1.5

BC = 4.5

AC = 6

Notice from the previous example that AB + BC = AC.

Therefore...

POSTULATE 2
SEGMENT ADDITION POSTULATE

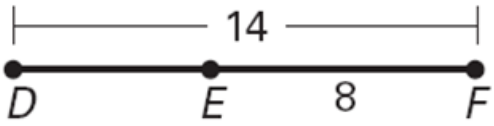
If B is between A and C, then AB + BC = AC.
If AB + BC = AC, then B is between A and C.

Example 3: Use the diagram to find AC.

$AB + BC = AC$

$10 + 3 = AC = 13$

Example 4: Use the diagram to find DE.

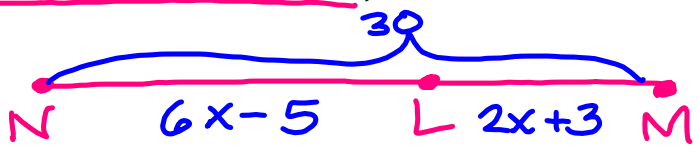


$DE = 6$

Example 5

Find LM if L is between N and M,
NL = 6x - 5,
LM = 2x + 3,
and NM = 30.

collinear



$NL + LM = NM$

$(6x-5) + (2x+3) = 30$

$8x - 2 = 30$

$+2 \quad +2$

$\frac{8x}{8} = \frac{32}{8}$

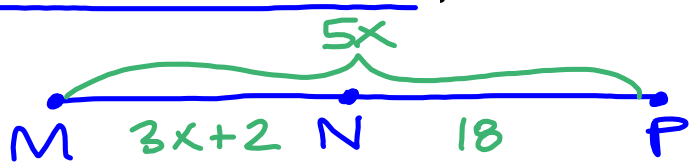
$x = 4$

$LM = 2(4) + 3$

$LM = 11$

Example 6

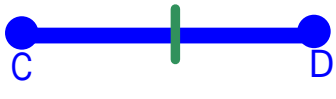
Find MN if N is between M and P,
MN = 3x + 2,
NP = 18,
and MP = 5x.



MN + NP = MP
(3x+2) + 18 = 5x
3x + 20 = 5x
−3x −3x
20 = 2x
20/2 = 2x/2
10 = x

MN = 3(10) + 2

MN = 32



congruent segments- segments that have the same length

Segments are congruent.

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

"is congruent to"

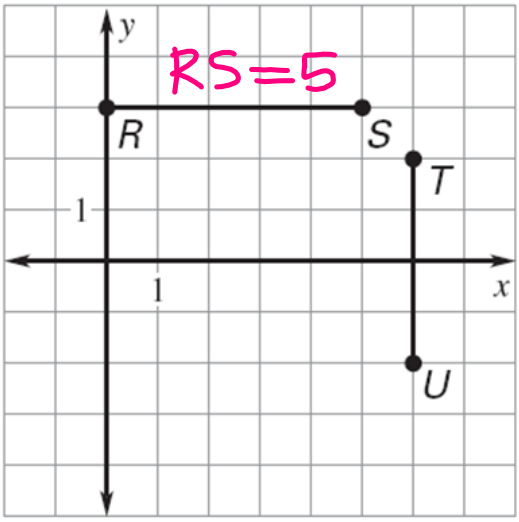
Segments are equal.

measurements

AB = CD

"is equal to"

Are the segments shown in the coordinate plane congruent?



TU = 4

$\overline{TU}$ and $\overline{RS}$ have different lengths...
so they are not congruent.