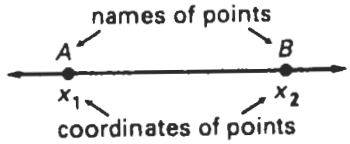
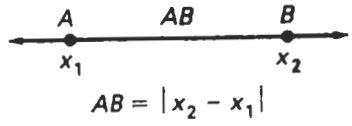
Section 1.3 Segments and Their Measures

▶**Postulate** or axiom is a rule that is accepted without proof.

Postulate1: Ruler Postulate
Points on a line can be matched one to one with real numbers. The real number that corresponds to the point is the **coordinate**. The **distance** between the points is the absolute value of the difference between the coordinates.
(* Distance on a number line)

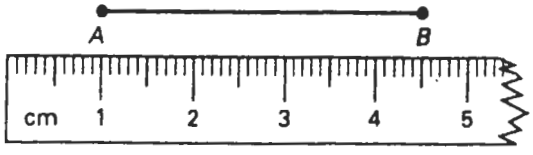




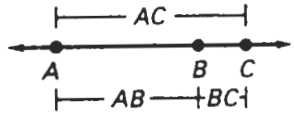
$AB = |x_2 - x_1|$

AB represents the distance between A and B.
AB is also called the **length** of $\overline{AB}$.

Example: Find AB

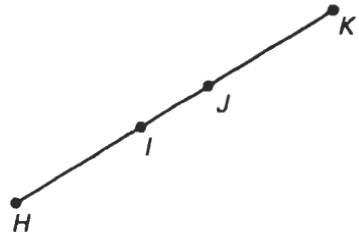


Postulate 2: Segment Addition Postulate
If B is between A and C, then AB + BC = AC.
If AB + BC = AC, then B is between A and C



Example1: In the diagram of the collinear points, $HK = 9$, $HI = JK$, and $IJ = 1$. Find the following lengths.

a. *HI*
b. *JK*
c. *HJ*
d. *IK*



Example 2: Suppose **M** is between L and N. Use the segment addition postulate to solve for the variable.

a. LM = $2x + 4$
MN= $3x + 6$
LN = 160

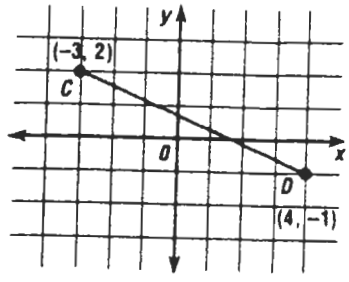
b. LM = $2x + 4$
MN = $x + 8$
LN = $6x - 12$

▶ Distance Formula

(* Distance in the coordinate plane.)

If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in a coordinate plane, then the distance between A and B is $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

Find CD.



$$CD = \sqrt{(-3-4)^2 + [2-(-1)]^2}$$

$$= \sqrt{(-7)^2 + 3^2}$$

$$= \sqrt{49 + 9}$$

$$= \sqrt{58}$$

Segments that have the same length are called **congruent segments.**