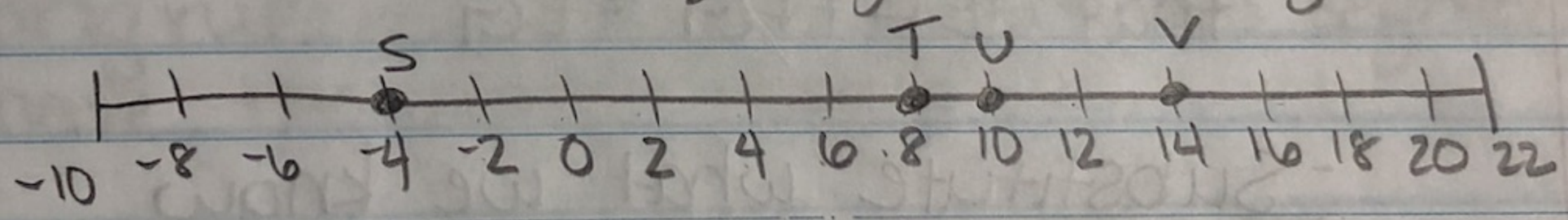
1.3 Measuring Segments

Goal: I can find and compare lengths of segments

Postulate 1-5 - Ruler Postulate

- Every point on a line can be paired with a real number. This makes a one to one correspondence between the points on the line and the real numbers. The real number that corresponds to a point is called the coordinate of the point
- Use a ruler or number line

Measuring Segment Lengths



- What is ST?

12

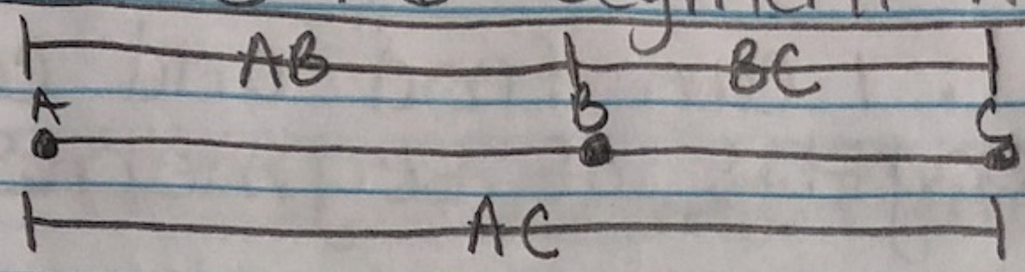
- What is UV?

4

- What is SV?

18

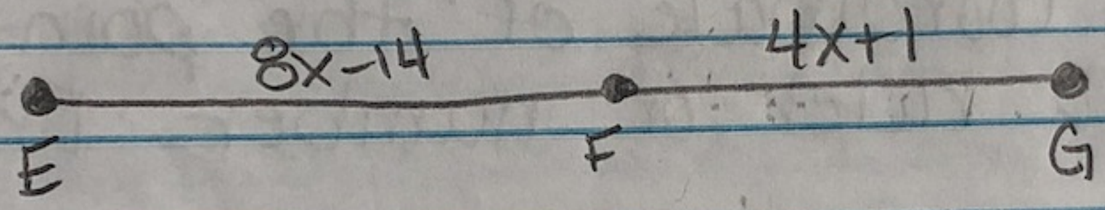
Postulate 1-6 - Segment Addition Postulate



- If three points A, B, and C are collinear and B is between A and C, then
  $AB + BC = AC$

Using the Segment Addition Postulate

- If $EG = 59$, what are EF and FG?



- Using the postulate, we know that $EF + FG = EG$

- Substitute what we know

$$(8x-14) + (4x+1) = 59$$

- Solve for X

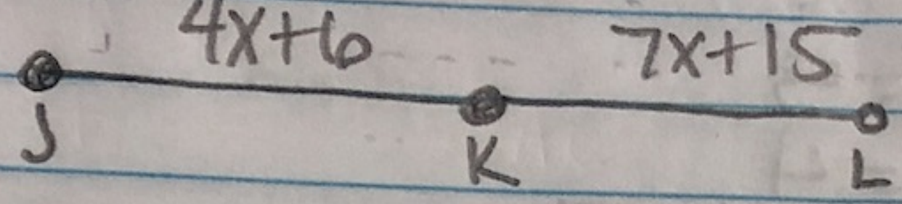
$$12x - 13 = 59$$
$$12x = 72$$
$$x = 6$$

- Substitute to find EF and FG

$EF = 8(6) - 14$
$EF = 34$

$FG = 4(6) + 1$
$FG = 25$

-If JL = 120, what are JK and KL?



$JK + KL = JL$

$(4x+6) + (7x+15) = 120$

$11x + 21 = 120$
$11x = 99$
$x = 9$

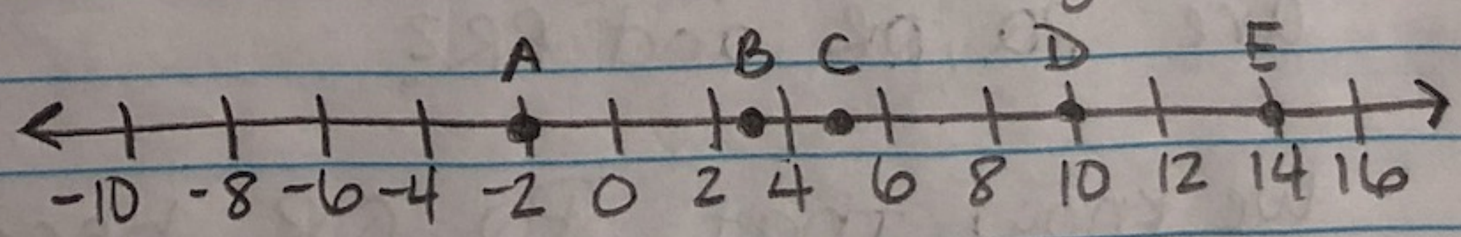
$JK = 4(9) + 6$ $\quad$ $KL = 7(9) + 15$
$JK = 42$ $\quad$ $KL = 78$

-Congruent segments ($\cong$) - two segments have the same length

-If $AB = CD$, then $\overline{AB} \cong \overline{CD}$

Comparing Segment Lengths

-Are $\overline{AC}$ and $\overline{BD}$ congruent?



$\overline{AC} = 7$
$\overline{BD} = 7$

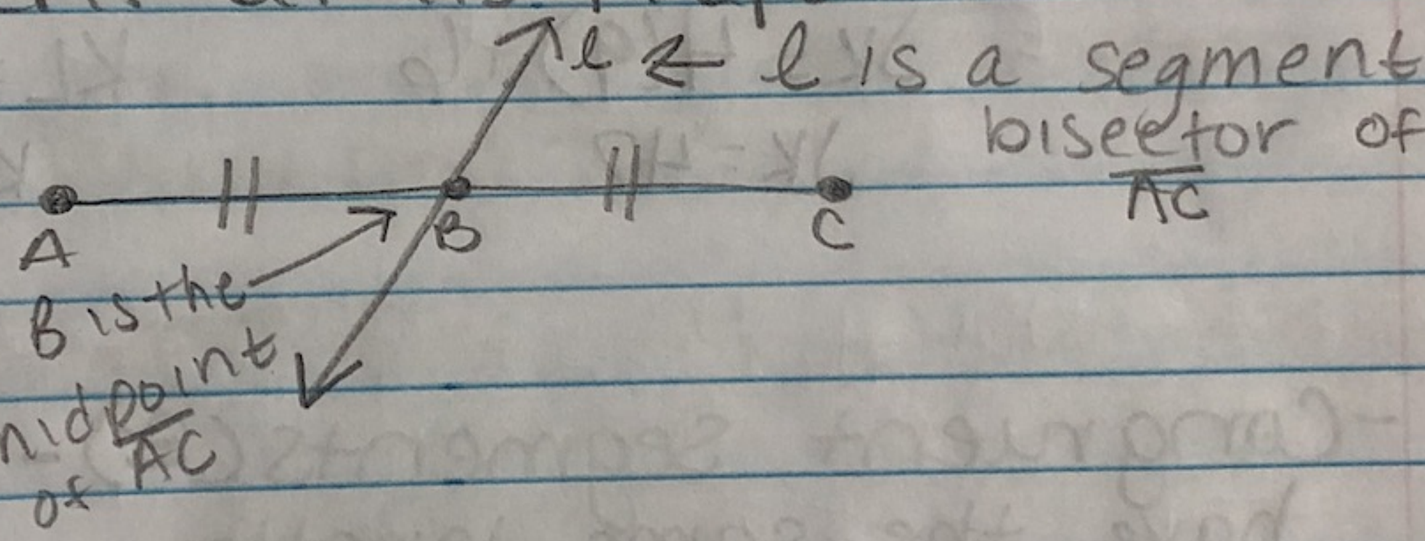
$\overline{AC} \cong \overline{BD}$

- Are $\overline{AB}$ and $\overline{DE}$ congruent?

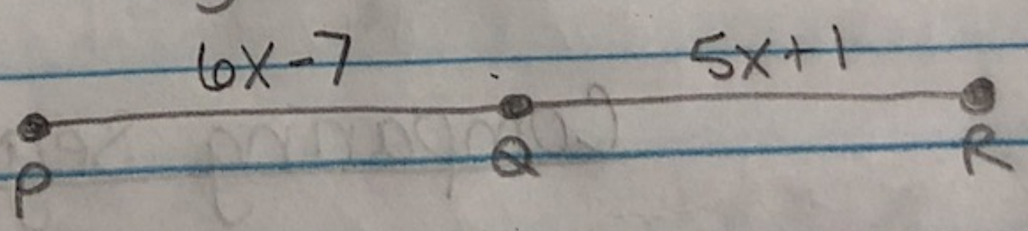
$\overline{AB} = 5$
$\overline{DE} = 4$
$\overline{AB} \neq \overline{DE}$

- Midpoint - a point that divides the segment into two congruent segments

- segment bisector - a point, line, ray, or other segment that intersects a segment at its midpoint



Using the Midpoint



Q is the midpoint of $\overline{PR}$. What are PQ, QR and PR?

We know that PQ = QR because Q is the midpoint.

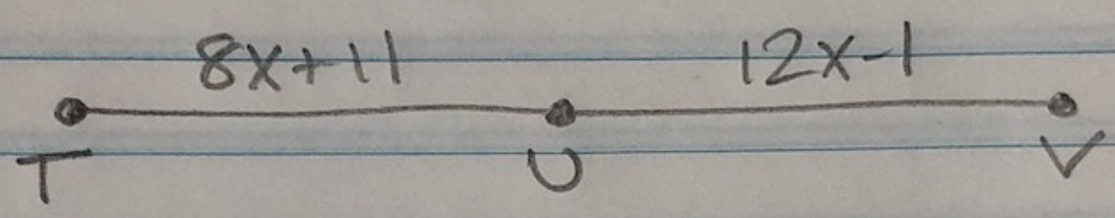
$6x - 7 = 5x + 1$

$$6x - 7 = 5x + 1$$
$$6x = 5x + 8$$
$$x = 8$$

$PQ = 6(8) - 7$ $\qquad$ $QR = 5(8) + 1$

$PQ = 41$ $\qquad$ $QR = 41$

$$PR = 41 + 41 = 82$$



U is the midpoint of $\overline{TV}$. What are TU, UV, and TV?

$\overline{TU} = \overline{UV}$ since U is the midpoint

$$8x + 11 = 12x - 1$$
$$8x = 12x - 12$$
$$-4x = -12$$
$$x = 3$$

$\overline{TU} = 8(4) + 11$ $\qquad$ $UV = 12(4) - 1$

$8(3) + 11$ $\qquad$ $36 - 1$

35 $\qquad$ 35

$\overline{TU} + \overline{UV} = \overline{TV}$

$35 + 35 = 70$