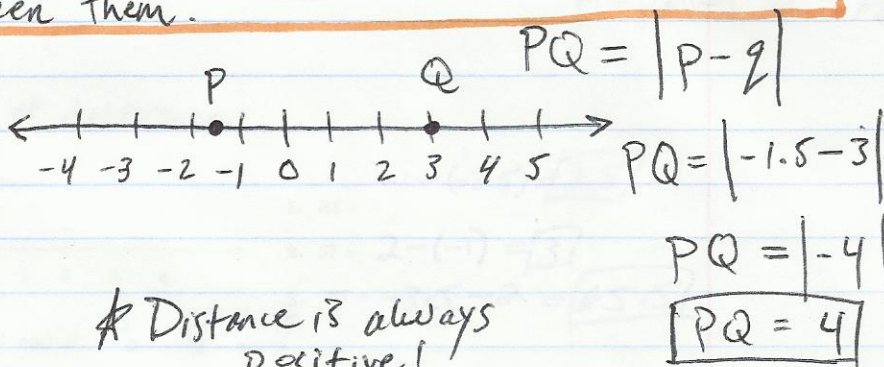


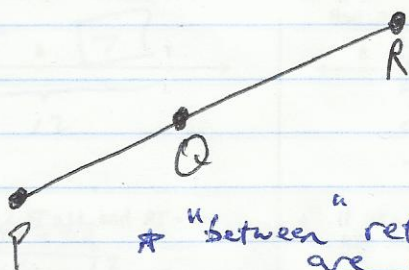
1-5 Measuring Segments

Ruler Postulate: points on a line can be paired with real numbers, so the distance b/w them is the absolute value of the difference between them.



* Distance is always positive!

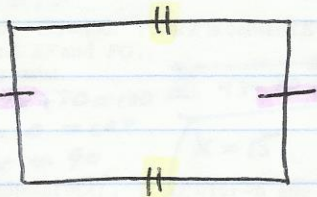
Segment Addition Postulate: If Q is between P and R, then $PQ + QR = PR$



If $PQ + QR = PR$, then Q is between P and R

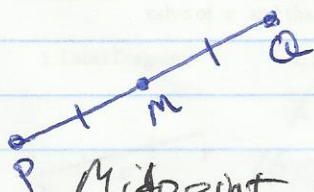
* "between" refers only to points that are collinear.

Congruent Segments have equal lengths

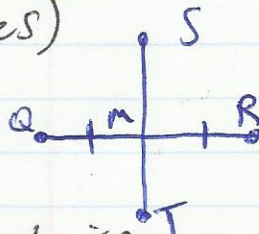


Same # of hash marks show congruent segments.

\cong means congruent (equal measures)

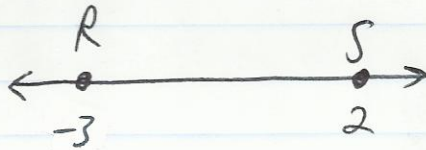


Midpoint divides a segment into \cong parts



Segment bisector intersects a segment through its midpoint.

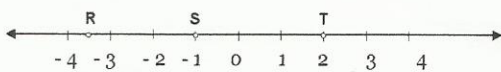
Finding Midpoint on a # line \rightarrow coordinate is the average of the endpoint coordinates.

Ex)  $\frac{-3+2}{2} = \frac{-1}{2}$

midpoint @ $-\frac{1}{2}$

- Abs. value of difference

Example 1: Find RS, ST, and RT:



1. $RS = -1 - (-3.5) = \boxed{2.5}$
 2. $ST = 2 - (-1) = \boxed{3}$
 3. $RT = -3.5 - 2 = \boxed{-5.5}$

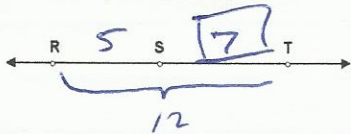
Example 2: T is BETWEEN pt. S and E.




L is NOT between S and T.

Practice: Find the missing values. ALWAYS USE A DIAGRAM TO ASSIST.

1. If $RS = 5$, and $RT = 12$, find ST .

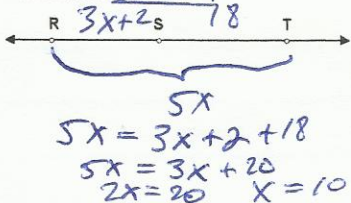


2. If $RS = 2x$ and $ST = 5$ and $RT = 31$, find RS .

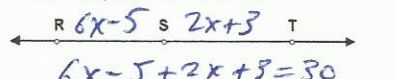


$$\begin{array}{r} 2x + 5 = 31 \\ -5 \quad -5 \\ \hline 2x = 26 \quad x = 13 \end{array}$$

3. If $RS = 3x + 2$, $ST = 18$, and $RT = 5x$, determine RS .



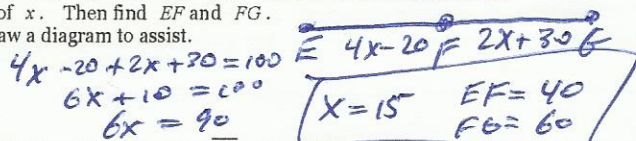
4. If $RS = 6x - 5$, $ST = 2x + 3$, and $RT = 30$, find RS and ST .



$$\begin{array}{l} 6x - 5 + 2x + 3 = 30 \\ 8x - 2 = 30 \\ 8x = 32 \quad x = 4 \end{array}$$

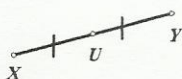
5. $EF = 4x - 20$ and $FG = 2x + 30$. $EG = 100$. Point F is between E and G.

Find the value of x . Then find EF and FG .
 First step: Draw a diagram to assist.



Example 3: Point U is the midpoint of XY . If $XY = 16x - 6$ and $UY = 4x + 9$, find the value of x and the measure of XY .

1. Label Diagram:



2. Solve for x (algebra):

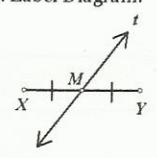
$$\begin{array}{l} XY = UY + UX \\ 16x - 6 = 4x + 9 + 4x + 9 \\ 16x - 6 = 8x + 18 \\ 8x - 6 = 18 \\ 8x = 24 \\ x = 3 \end{array}$$

3. Measure of XY (plug in):

$$\begin{array}{l} 16(3) - 6 \\ 48 - 6 \\ \boxed{XY = 42} \end{array}$$

Example 4: Line t is a segment bisector of \overline{XY} at point M , find XM and MY if $XM = 3x + 6$ and $MY = 2x + 14$.

1. Label Diagram:



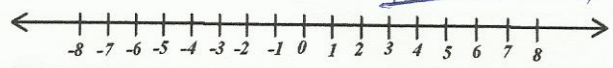
2. Solve for x (algebra):

$$\begin{aligned} XM &= MY \\ 3x + 6 &= 2x + 14 \\ x + 6 &= 14 \\ x &= 8 \end{aligned}$$

3. Measure of XM and MY :

$$\begin{aligned} 3(8) + 6 &= 24 + 6 \\ XM &= 30 \\ MY &= 30 \end{aligned}$$

Example 5: On a number line:

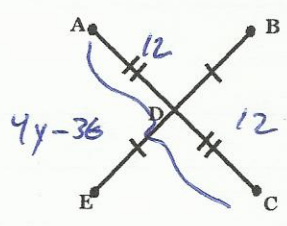


Find the midpoint between the following coordinates:

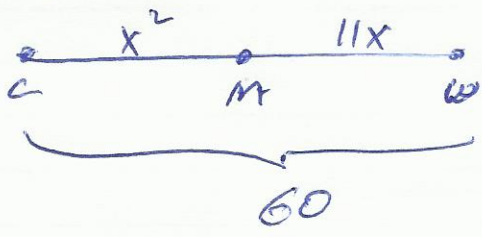
- a. 2 and 8 b. -4 and 2 c. 1 and 6 d. -8 and 7
- 5 -1 3.5 $-\frac{1}{2}$ or -0.5

Example 6: If $AD = 12$ and $AC = 4y - 36$, find the value of y . Then find AC and DC .

$$\begin{aligned} 4y - 36 &= 24 \\ 4y &= 60 \\ y &= 15 \end{aligned}$$



Example 7: M is between C and W , $CM = x^2$, $MW = 11x$, and $CW = 60$. Find x .



$$\begin{aligned} x^2 + 11x &= 60 \\ x^2 + 11x - 60 &= 0 \\ (x - 4)(x + 15) &= 0 \\ \boxed{x = 4} & \end{aligned}$$