Warm Up

1. Place Homework on corner of desk so I can check completion.

2. Write:
   a. 3 things we can assume
   b. 3 things we cannot assume

Midpoints, bisectors and trisectors

I CAN…

- Define and identify midpoint, angle bisector and trisector
- Write proofs involving bisectors and trisectors

Draw a figure in which…

- A, B, and C are collinear
- A, D, and E are collinear
- B, C, and D are noncollinear

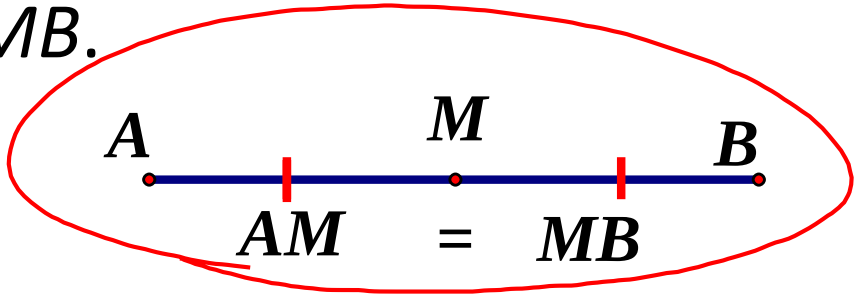
- F is between A and E
- F is between R and S
- A, E, R and S are noncollinear

Draw a figure in which…

- A, K, O and Y are collinear
- K is between O and A
- The length of AO added to the length of AY is equal to the length of OY (OA + AY = OY)
- A is to the right of O

Midpoint: a point that divides a segment into two congruent segments.

- The midpoint, *M*, of $\overline{AB}$ is the point between *A* and *B* such that *AM* = *MB*.



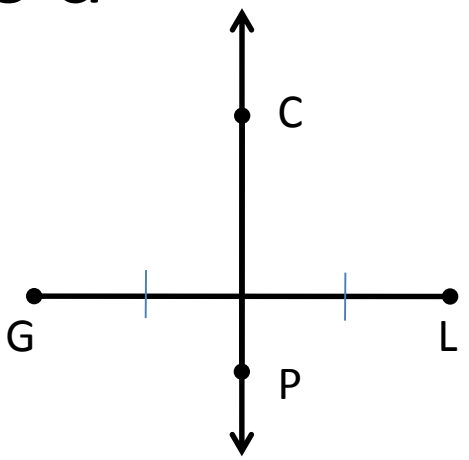
- Alternate Definition: The point on a line segment that is equidistant from its endpoints.
- NOTE: rays and lines cannot have midpoints. Why?

We can also say that a midpoint *bisects* a line segment...

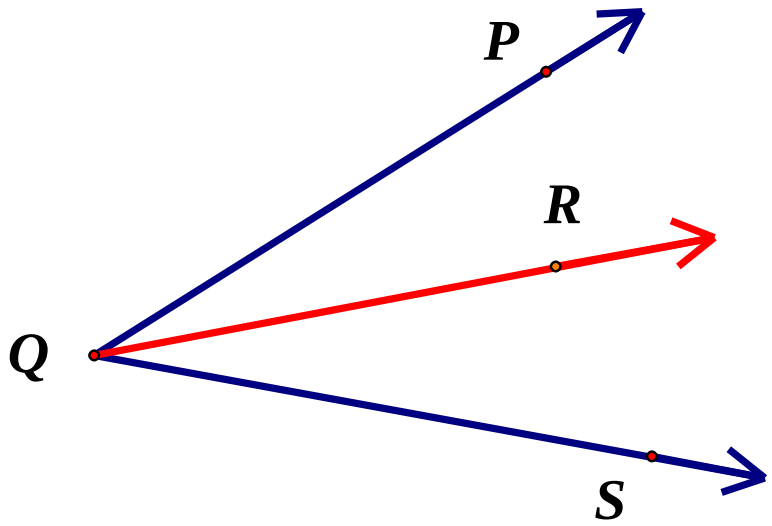
- **Bisect**: cut into two equal parts.

- **Segment Bisector**: a segment, ray, line or plane that intersects a segment at its midpoint.

- $\overleftrightarrow{CP}$ bisects $\overline{GL}$



ANGLE BISECTOR - For ray QR to be the angle bisector of $\angle PQS$, point R must be on the interior of $\angle PQS$ and $\angle PQR$ must be congruent to $\angle RQS$.



In other words, a ray must divide an angle into two congruent, adjacent angles.

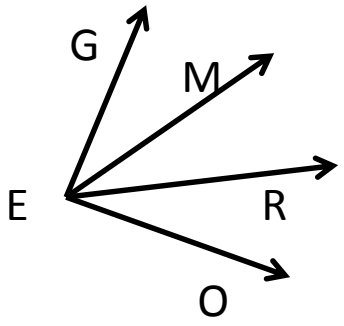
Segments and angles can also be *trisected*...

- **Trisect**: cut into three equal parts.
  - **Trisection points**: the two points where a segment is divided.

If $\overline{AR} \cong \overline{RS} \cong \overline{SC}$ what conclusions can we draw?

  - **Angle trisectors**: the two rays that divide an angle

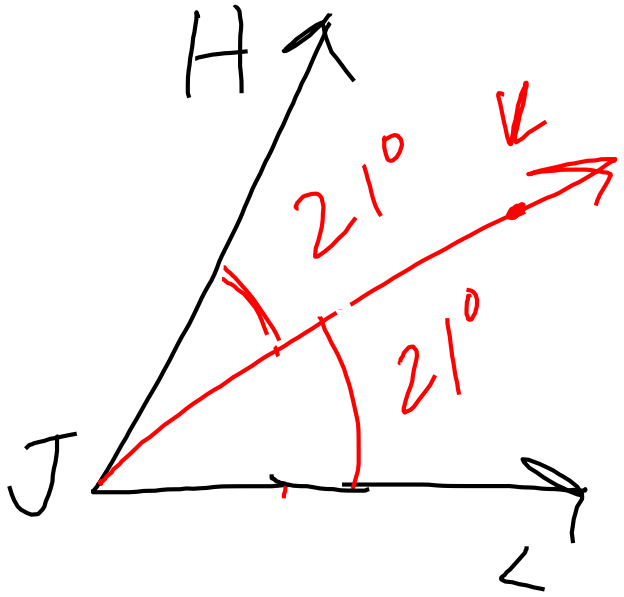
$\angle GEO$ is trisected by the two interior rays.
What conclusions can we draw?



Example 1

measure

JK bisects $\angle HJL$. Given that $m\angle HJL = 42°$, what are the measures of $\angle HJK$ and $\angle KJL$?



Example 2

In the diagram, MO bisects ∠LMN. The measures of the two congruent angles are $(3x - 20)°$ and $(x + 10)°$. Solve for x and find the measure of all three angles.

$3x - 20 = x + 10$

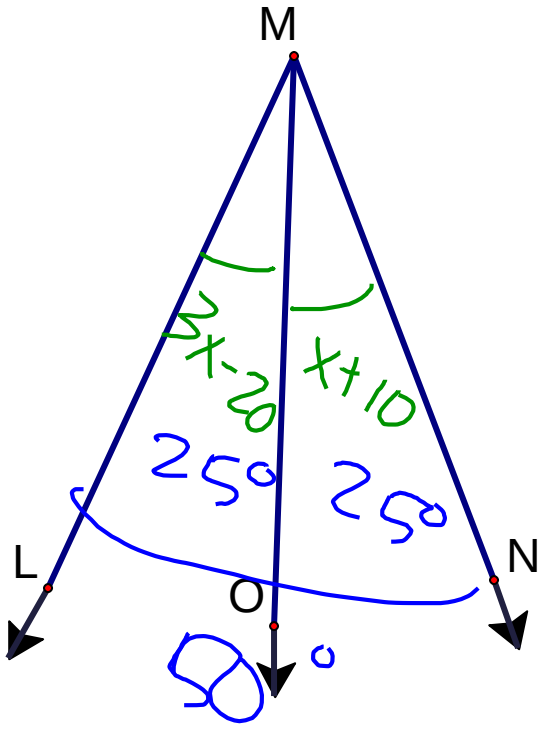
$-x \quad -x$

$2x - 20 = 10$

$+20 \quad +20$

$2x = 30$

$x = 15$

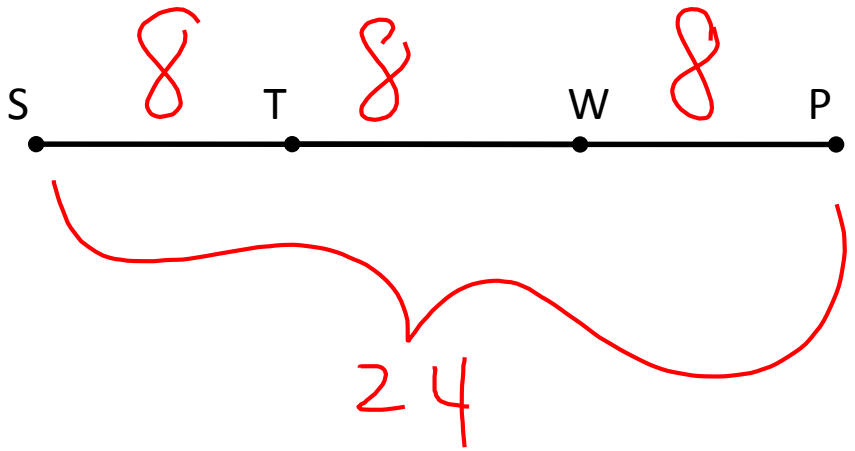


Example 3

You are given that *T* and *W* are trisection points on $\overline{SP}$ and SP = 24.

Find ST. 8

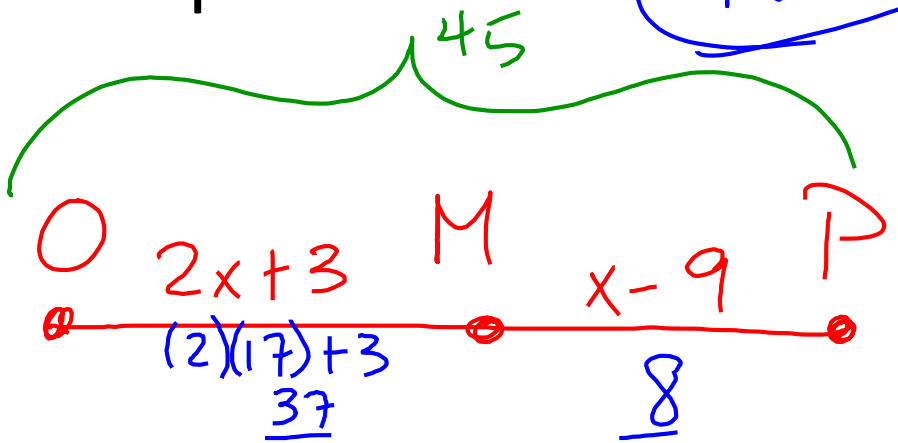
Find SW. 16



Example 4

Given OM = $2x + 3$, MP = $x - 9$ and OP = 45.

Is M the midpoint of OP? NO



$2x + 3 + x - 9 = 45$

$3x - 6 = 45$

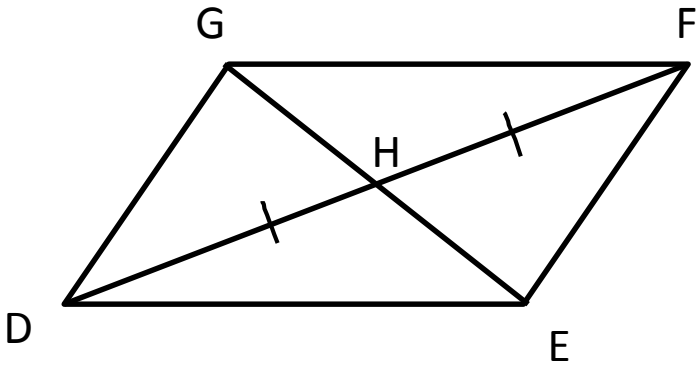
$3x = 51$

$x = 17$

Example 5

Given: $\overline{DH} \cong \overline{HF}$

Prove: H is the midpoint of $\overline{DF}$



STATEMENTS	REASONS
(1) $\overline{DH} \cong \overline{HF}$	(1) Given
(2) H is the midpoint of $\overline{DF}$	(2) If a point divides a seg. into 2 $\cong$ segs, then it is a midpt.

Homework

- p. 26 #6, 7
- p. 32 #5 – 7, 9 – 12, 14, 18