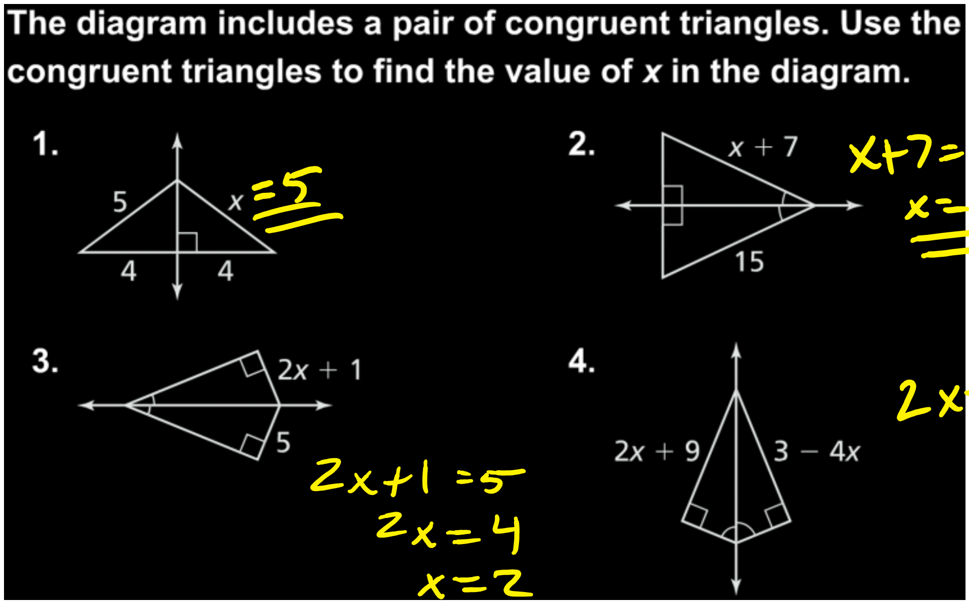
Warm Up



1. $x = 5$

2. $x + 7 = 15$
$x = 8$

3. $2x + 1 = 5$
$2x = 4$
$x = 2$

4. $2x + 9 = 3 - 4x$
$6x = -6$
$x = -1$

Essential Question

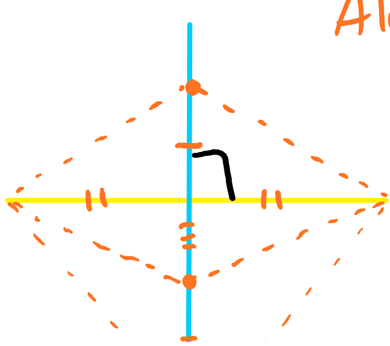
What is the relationship between a segment and the points on its perpendicular bisector? Between an angle and the points on its bisector?

Needed Vocab:

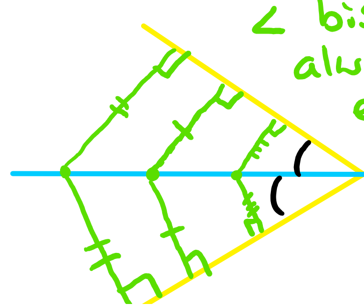
- **Equidistant**

Goal: "I can...

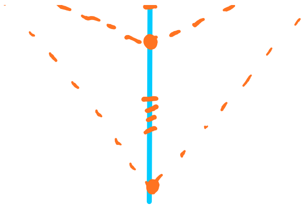
Use perpendicular and angle bisectors to solve problems."

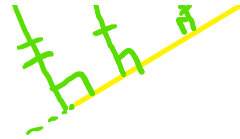


Always ≅ Δ's w/ a point on the ⊥ bisector.



Any point on the ∠ bisector is always equidistant to the sides.



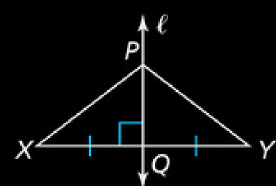


sides.

Perpendicular Bisector Theorem

If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

If...



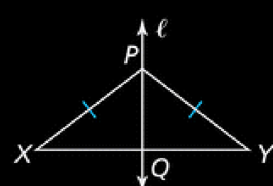
PROOF: SEE EXAMPLE 2.

Then... $PX = PY$

Converse of the Perpendicular Bisector Theorem

If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.

If...

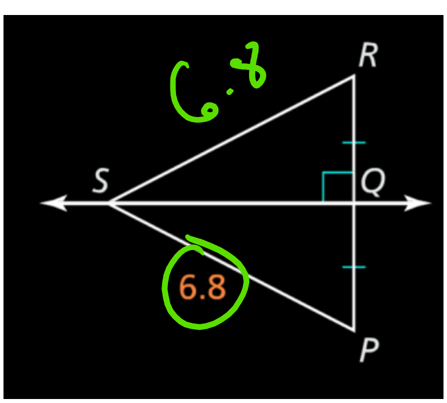


PROOF: SEE EXAMPLE 2 TRY IT.

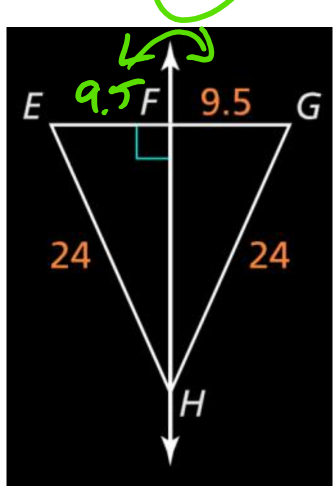
Then... $XQ = YQ$ and $\overleftrightarrow{PQ} \perp \overline{XY}$

Example 1

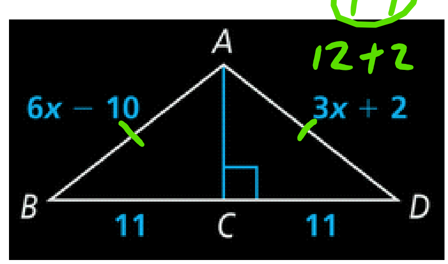
Find RS.



Find EG. 19



Find AD. 14

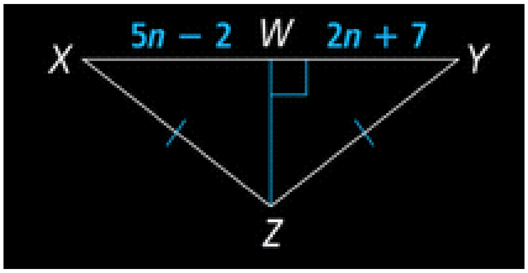


$6x-10=3x+2$

$3x=12$

$x=4$

Find WY?



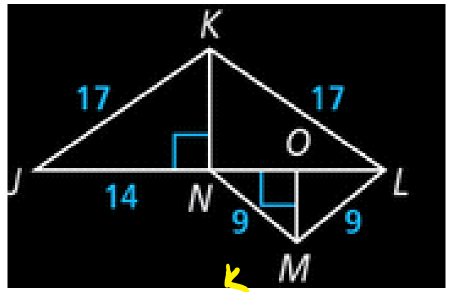
5n-2 = 2n+7

3n = 9

n = 3

13

Find OL?

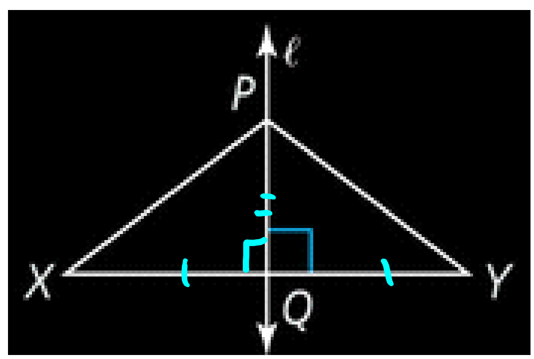


OL = 7

Example 2

Given: *l is perpendicular bisector of* $\overline{XY}$

Prove: PX=PY



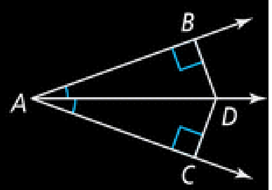
Statement	Reason
l ⊥ bisector of $\overline{XY}$	Given
XQ = QY	Def. of bisector
PQ ≅ PQ	Reflexive
∠PQX = ∠PQY = 90°	Def. of ⊥
△PQX ≅ △PQY	SAS
PX = XY	CPCTC

Angle Bisector Theorem

If a point is on the bisector of an angle, then it is equidistant from the two sides of the angle.

PROOF: SEE EXERCISE 9.

If...



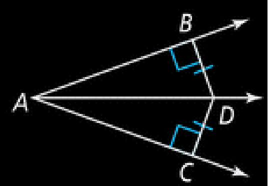
Then... $BD = CD$

Converse of the Angle Bisector Theorem

If a point is equidistant from two sides of an angle, then it is on the angle bisector.

PROOF: SEE EXERCISE 10.

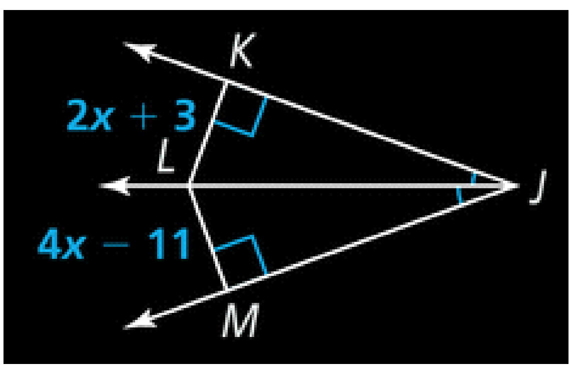
If...



Then... $m\angle BAD = m\angle CAD$

EXAMPLE 3

Find KL?



$2x+3=4x-11$

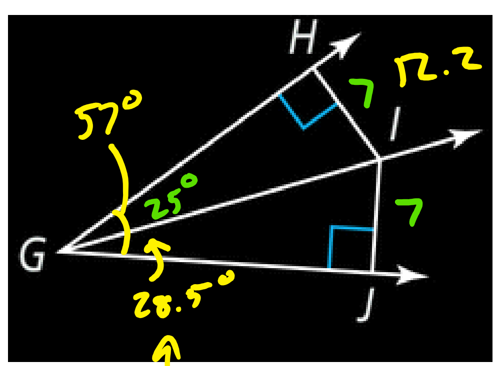
$14=2x$

$7=x$

$14+3$

$\boxed{17}$

For the questions below use the same diagram but use the measures indicated.



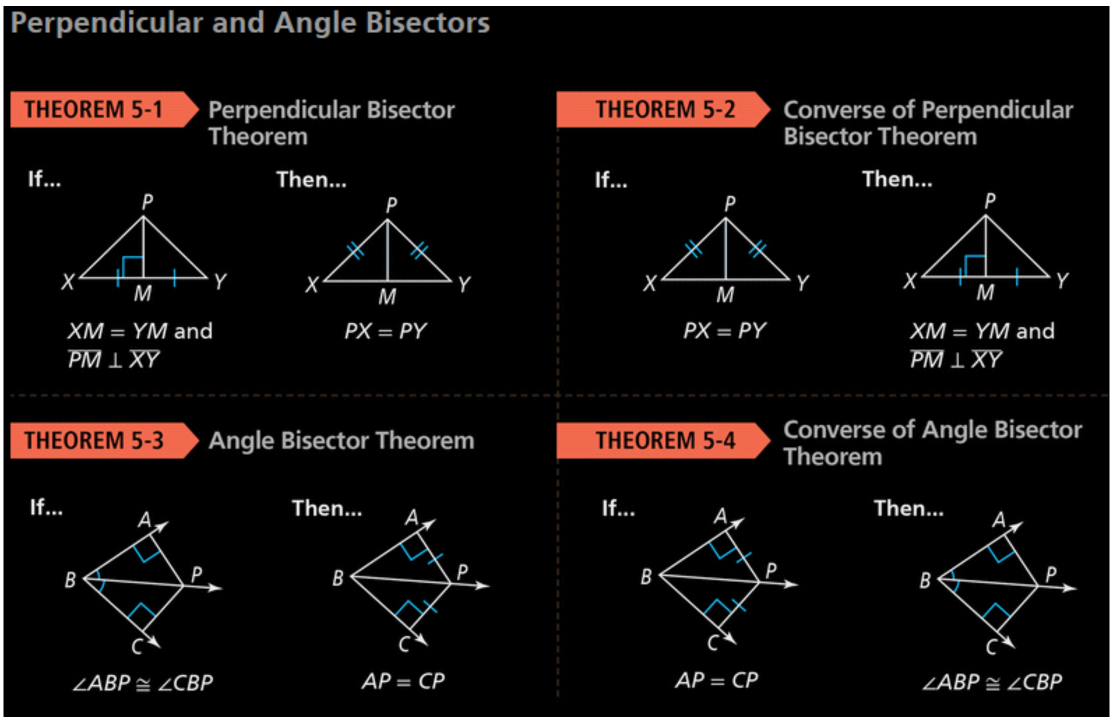
If HI=7, IJ=7, and the measure of angle HGI=25°, what is the measure of angle IGJ?

equidistant ∴ bisector $\boxed{25°}$

If the measure of angle HGJ=57°, the measure of angle IGJ=28.5°. and HI=12.2. what is the value IJ?

If the measure of angle HGJ=57°, the measure of angle IGJ=28.5°, and HI=12.2, what is the value IJ?

half of 57.
bisector
∴ equidistant
12.2



Homework

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