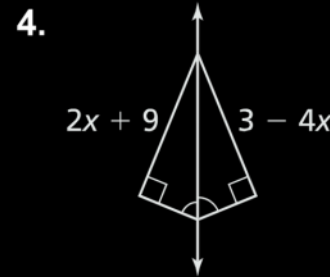
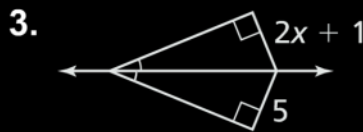
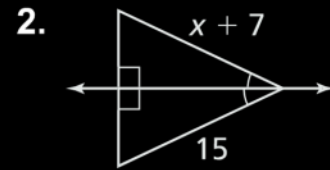
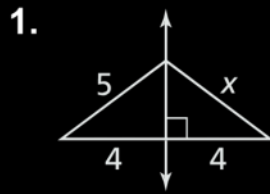


WARM UP

The diagram includes a pair of congruent triangles. Use the congruent triangles to find the value of x in the diagram.



ESSENTIAL QUESTION

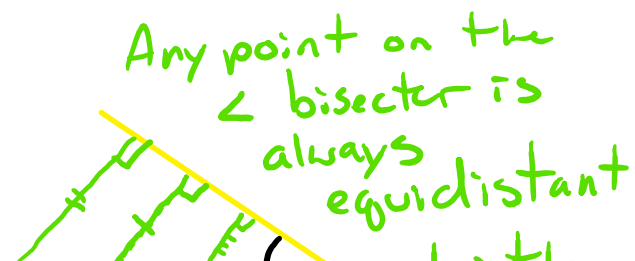
What is the relationship between a segment and the points on its perpendicular bisector? Between an angle and the points on its bisector?

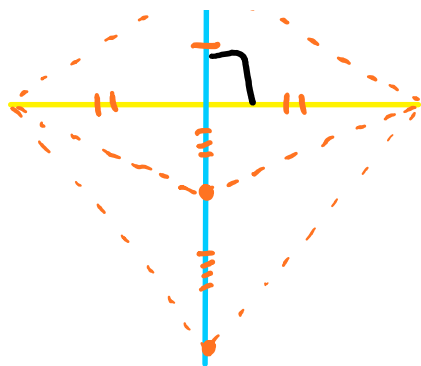
NEEDED VOCAB:

► **Equidistant**

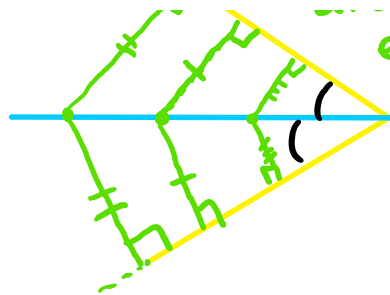
GOAL: "I CAN ...

Use perpendicular and angle bisectors to solve problems."





on the
⊥ bisector.



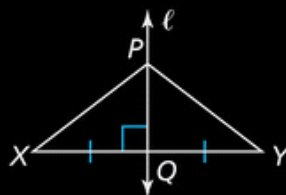
equidistant
to the
sides.

Perpendicular Bisector Theorem

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

PROOF: SEE EXAMPLE 2.

If...



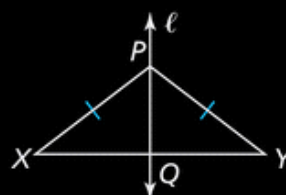
Then... $PX = PY$

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.

PROOF: SEE EXAMPLE 2 TRY IT.

If...



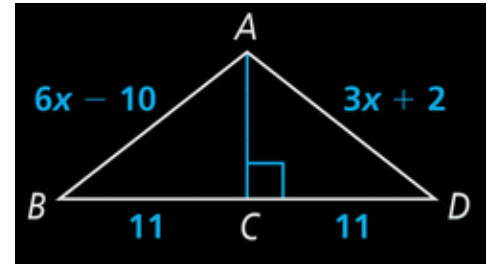
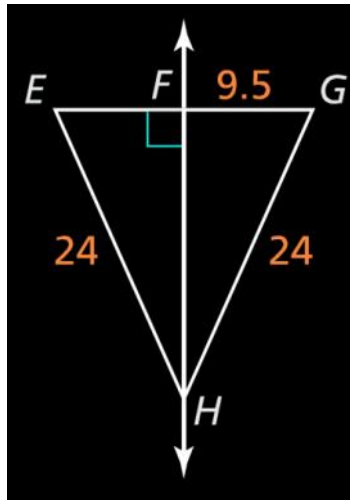
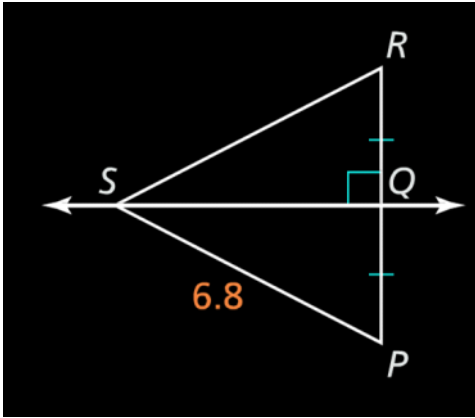
Then... $XQ = YQ$ and $\vec{PQ} \perp \vec{XY}$

EXAMPLE 1

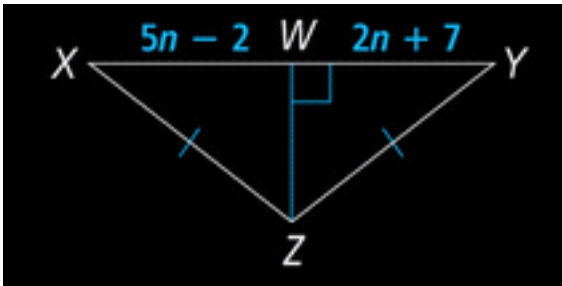
Find RS.

Find EG.

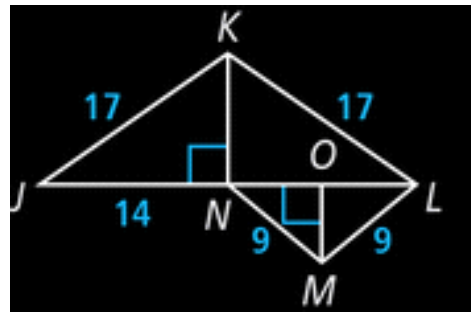
Find AD.



Find WY?



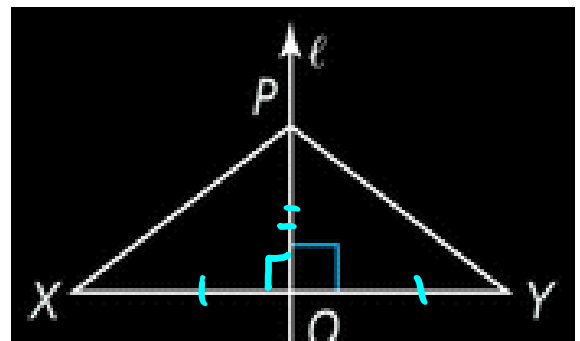
Find OL?



EXAMPLE 2

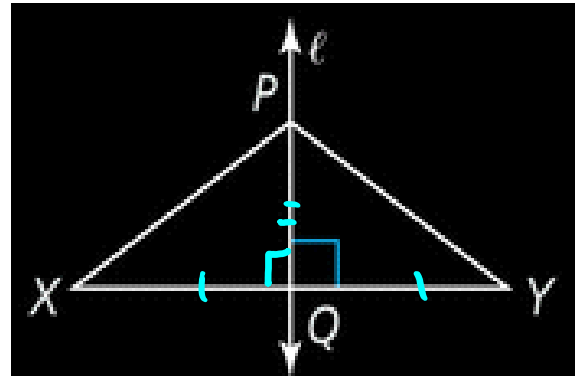
Given: l is perpendicular bisector of \overline{XY}

Prove: $PX=PY$



Given: l is perpendicular bisector of XY

Prove: $PX=PY$

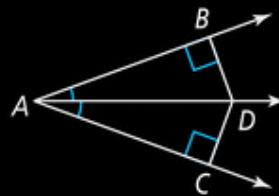


Angle Bisector Theorem

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...



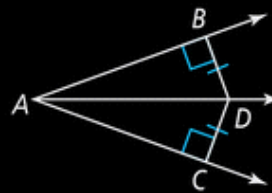
Then... $BD = CD$

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.

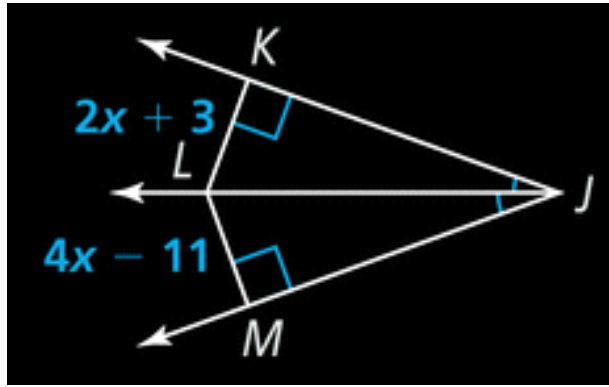
If...



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

EXAMPLE 3

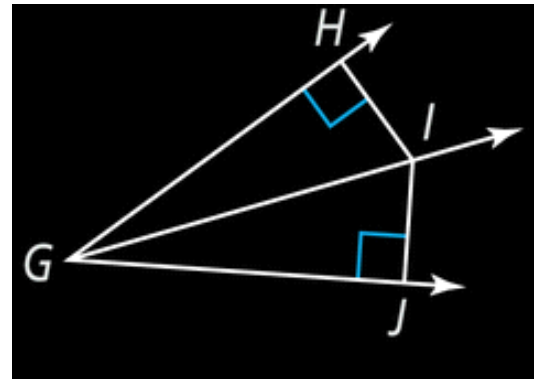
Find KL ?



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

If $HI=7$, $IJ=7$, and the measure of angle $HGI=25^\circ$, what is the measure of angle IGJ ?

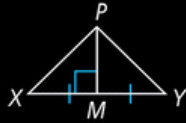
If the measure of angle $HGJ=57^\circ$, the measure of angle $IGJ=28.5^\circ$, and $HI=12.2$, what is the value IJ ?



Perpendicular and Angle Bisectors

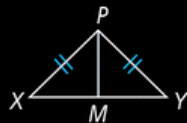
THEOREM 5-1 Perpendicular Bisector Theorem

If...



$$XM = YM \text{ and } PM \perp XY$$

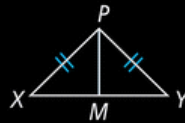
Then...



$$PX = PY$$

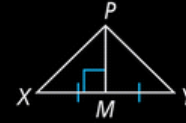
THEOREM 5-2 Converse of Perpendicular Bisector Theorem

If...



$$PX = PY$$

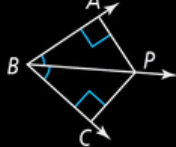
Then...



$$XM = YM \text{ and } PM \perp XY$$

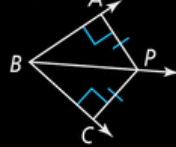
THEOREM 5-3 Angle Bisector Theorem

If...



$$\angle ABP \cong \angle CBP$$

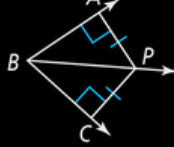
Then...



$$AP = CP$$

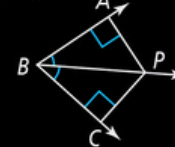
THEOREM 5-4 Converse of Angle Bisector Theorem

If...



$$AP = CP$$

Then...



$$\angle ABP \cong \angle CBP$$

HOMework

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11, 14-21, 25, 26