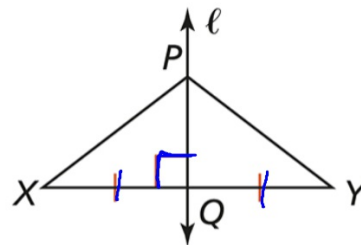


Perpendicular Bisector Theorem

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

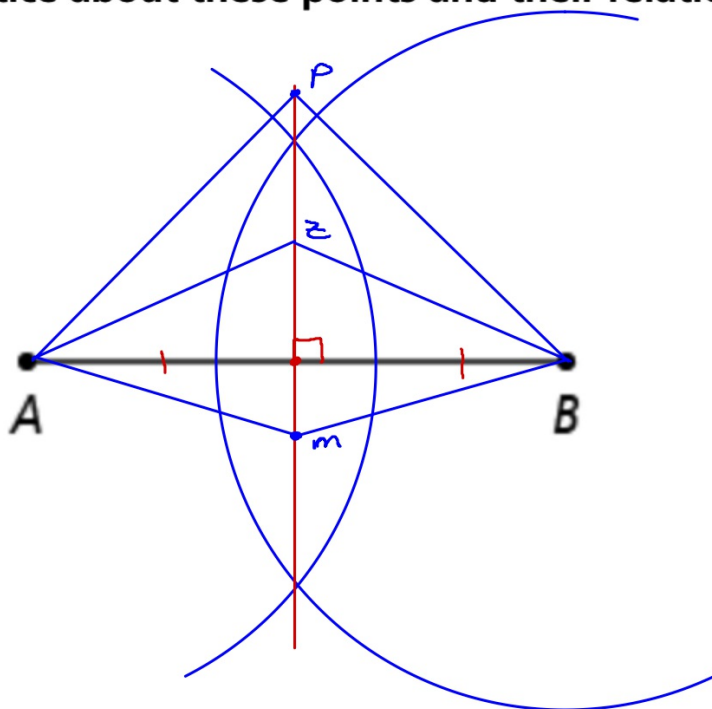
PROOF: SEE EXAMPLE 2.

If...



Then... $PX = PY$

How can you find points that are equidistant from the endpoints of \overline{AB} ?
What do you notice about these points and their relationship with \overline{AB} ?

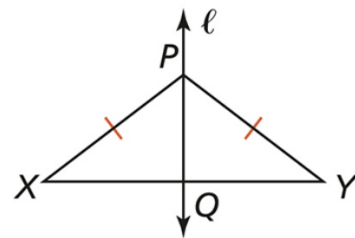


Converse of the Perpendicular Bisector Theorem

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 $\overleftrightarrow{PQ} \perp \overline{XY}$

What is the value of AD ?

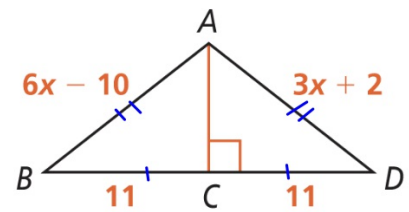
SOLUTION

$$6x - 10 = 3x + 2$$

$$3x - 10 = 2$$

$$3x = 12$$

$$x = 4$$



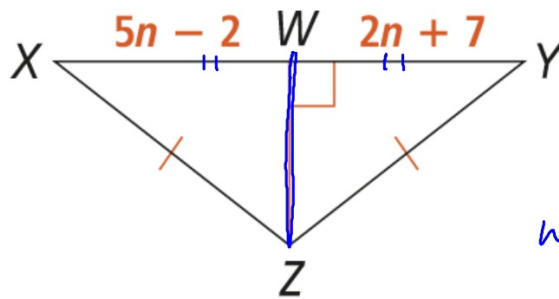
$$AD = 3x + 2$$

$$3(4) + 2$$

$$12 + 2$$

$$14$$

a. What is the value of WY ?



$$5n - 2 = 2n + 7$$

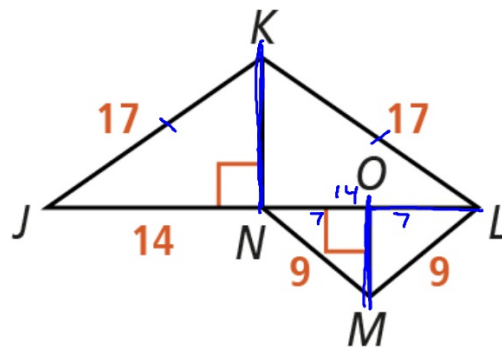
$$3n - 2 = 7$$

$$3n = 9$$

$$n = 3$$

$$\begin{aligned} WY &= 2n + 7 \\ &= 2(3) + 7 \\ &= 6 + 7 \\ &= 13 \end{aligned}$$

What is the value of OL ?

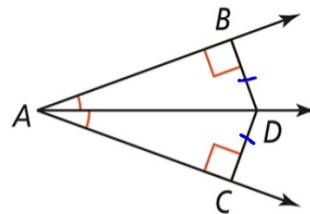


Angle Bisector Theorem

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... $BD = CD$

What is the value of KL ?

SOLUTION

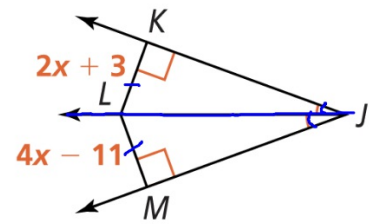
$$2x + 3 = 4x - 11$$

$$3 = 2x - 11$$

$$14 = 2x$$

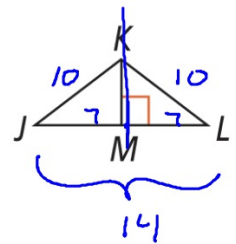
$$x = 7$$

$$\begin{aligned} KL &= 2x + 3 \\ &= 2(7) + 3 \\ &= 14 + 3 \\ &= 17 \end{aligned}$$



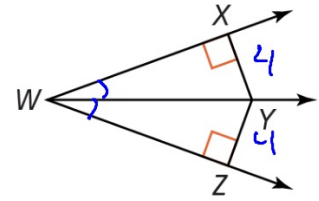
If $JL = 14$, $KL = 10$, and $ML = 7$, what is JK ?

Enter your answer



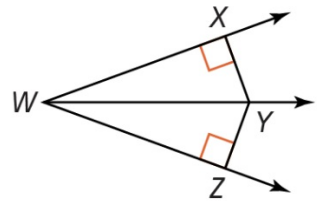
If $\angle XWY \cong \angle ZWY$ and $XY = 4$, what is YZ ?

Enter your answer

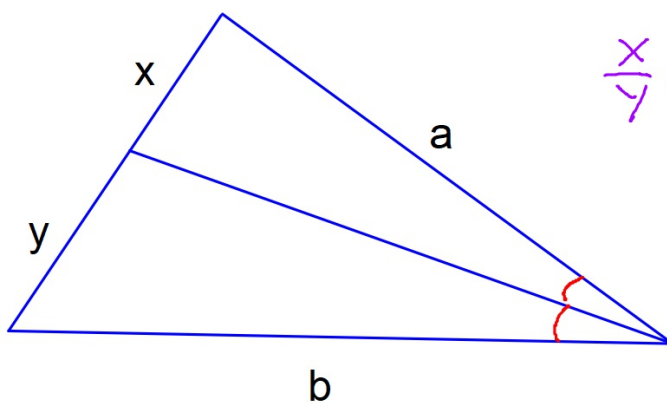


7. If $XY = 6.5$, $ZY = 6.5$, and $m\angle ZWY = 18$, what is $m\angle XWZ$?

Enter answer here

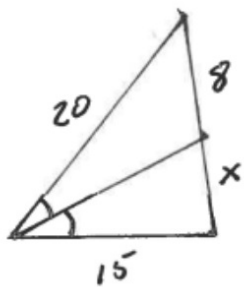


The angle bisector cuts the opposite side in the same ratio as the two other sides.



$$\frac{x}{y} = \frac{a}{b} \quad \text{or} \quad \frac{x}{a} = \frac{y}{b}$$

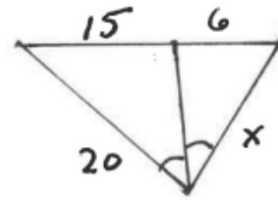
$$\frac{x}{y} = \frac{a}{b}$$



$$\frac{8}{x} = \frac{20}{15}$$

$$20x = 120$$

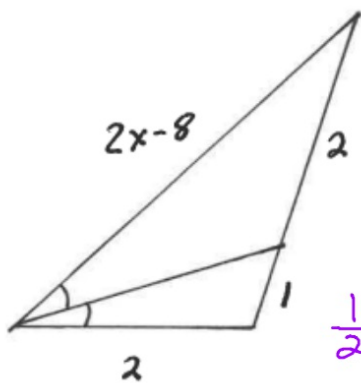
$$x = 6$$



$$\frac{15}{6} = \frac{20}{x}$$

$$15x = 120$$

$$x = 8$$

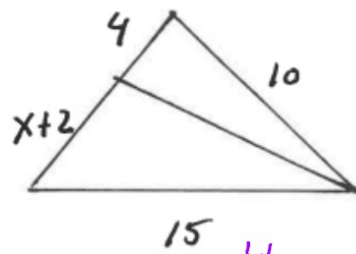


$$\frac{1}{2} = \frac{2}{2x-8}$$

$$2x-8 = 4$$

$$2x = 12$$

$$x = 6$$



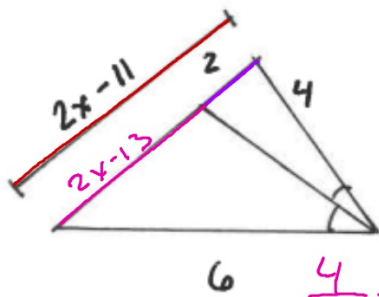
$$\frac{4}{x+2} = \frac{10}{15}$$

$$10(x+2) = 60$$

$$10x + 20 = 60$$

$$10x = 40$$

$$x = 4$$



6

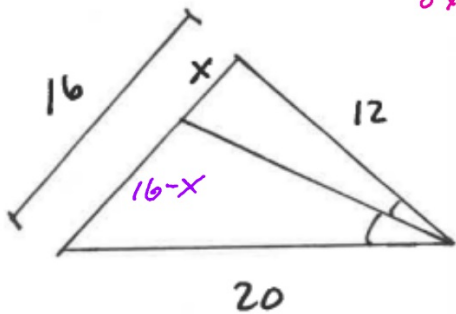
$$\frac{4}{6} = \frac{2}{2x-13}$$

$$4(2x-13) = 12$$

$$8x - 52 = 12$$

$$8x = 64$$

$$x = 8$$



20

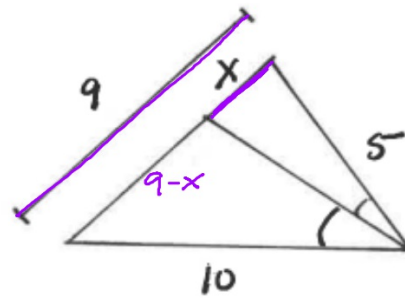
$$\frac{12}{20} = \frac{x}{16-x}$$

$$20x = 12(16-x)$$

$$20x = 192 - 12x$$

$$32x = 192$$

$$x = 6$$



10

$$\frac{5}{10} = \frac{x}{9-x}$$

$$5(9-x) = 10x$$

$$45 - 5x = 10x$$

$$45 = 15x$$

$$x = 3$$