

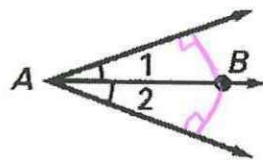
5-6 Angle Bisectors and Perpendicular Bisectors

Objective: Use angle bisectors and perpendicular bisectors

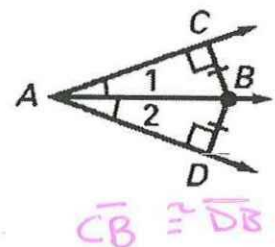
Perpendicular Bisector: a segment (or line) that divides a segment in half at a right angle

Angle Bisector Th: If a point is on the bisector of an angle, then it is equidistant from the 2 sides of the angle.

If

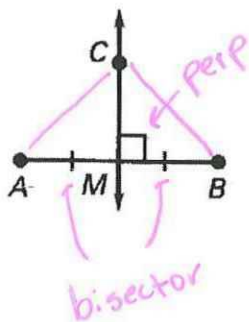


then

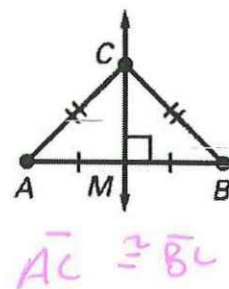


Perpendicular Bisector Th: If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

If



then



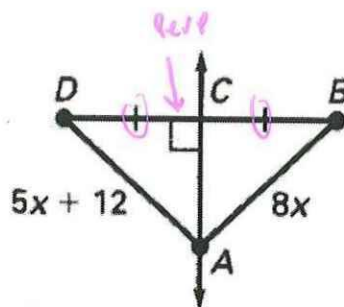
Examples:

1. Use the diagram to find AB.

Perp bisect th

$$\begin{array}{r} 8x = 5x + 12 \\ -5x \quad -5x \\ \hline 3x = 12 \end{array}$$

$$\frac{3x}{3} = \frac{12}{3} \quad \boxed{x = 4}$$

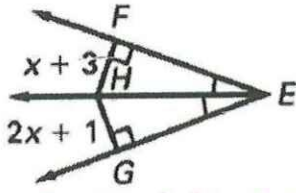


$$\overline{AB} = 8x$$

$$= 8(4)$$

$$\boxed{\overline{AB} = 32}$$

2. Find FH.

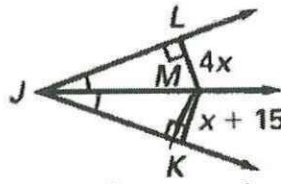


Angle bisector th

$$\begin{array}{r} 2x+1 \\ -x-1 \\ \hline x-2 \end{array}$$

 $x = 2$
 $FH = x+3$
 $2+3$
 $FH = 5$

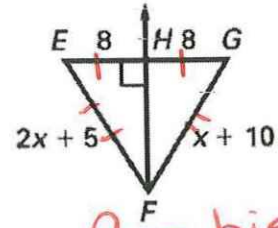
3. Find MK.
 $MK = x+15$
 $= 5+15$
 $MK = 20$



Angle bisect

$$\begin{array}{r} 4x \\ -x \\ \hline 3x = 15 \\ x = 5 \end{array}$$

4. Find EF.

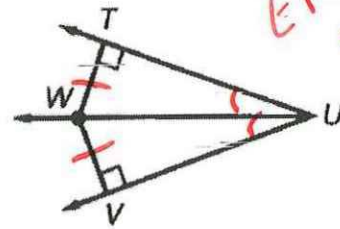


Perp bisector

$$\begin{array}{r} 2x+5 \\ -x-5 \\ \hline x = 5 \end{array}$$

 $EF = 2x+5$
 $= (2)(5)+5$
 $= 15$

5. In the diagram, \overrightarrow{UW} bisects $\angle TUV$.
 $\angle UTW$ and $\angle UVW$ are right angles.
 Prove that $\triangle TWU \cong \triangle VWU$.



Solution

Statements	Reasons
1. \overrightarrow{UW} bisects $\angle TUV$.	1. <u>Given</u>
2. $\angle TWU \cong \angle VWU$	2. Definition of angle bisector
3. $\overline{TW} \cong \overline{VW}$	3. Angle Bisector Theorem
4. $\angle UTW$ and $\angle UVW$ right angles.	4. <u>Given</u>
5. $\angle UTW \cong \angle UVW$	5. Right angles are \cong .
6. $\triangle TWU \cong \triangle VWU$	6. <u>AAS</u>

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