Geometry 6.1 Notes: Perpendicular and Angle Bisectors

In Chapter 3, you learned that a *perpendicular bisector* of a line segment if the line that is ⊥ to the segment at its

________________________________.

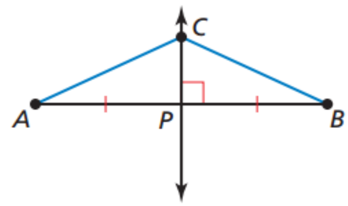
<u>Equidistant</u>: A point is equidistant from two figures when the point is the ____________ distance from each figure.

Perpendicular Bisector Theorem

In a plane, if a point lies on the perpendicular bisector of a segment,

then it is __________________ from the ____________

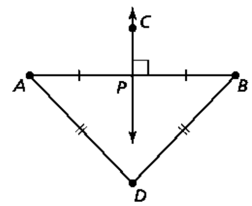
of the segment.



Converse of the Perpendicular Bisector Theorem

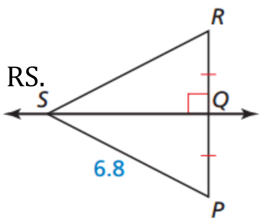
In a plane, if a point is __________________ from the endpoints

of a segment, then it lies on the __________________ of the segment.

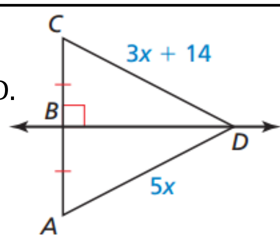


Examples:

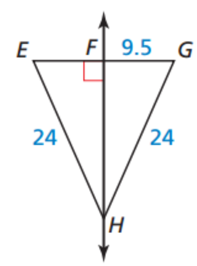
1. Find RS.



2. Find AD.

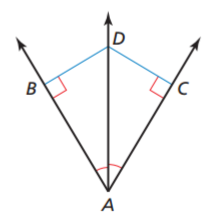


3. Find EG



In Chapter 1, you learned that an *angle bisector* is a ray that divides an angle into two congruent adjacent angles. You also learned that the *distance from a point to a line* is the length of the ⊥ segment from the point to the line.

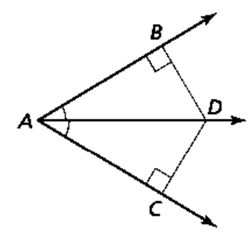
So, in the figure at right, $\overrightarrow{AD}$ is the bisector of $\angle BAC$, and the distance from point D to $\overrightarrow{AB}$ is DB, where $\overline{DB} \perp \overrightarrow{AB}$



Angle Bisector Theorem

If a point lies on the bisector of an angle, then it is ____________________

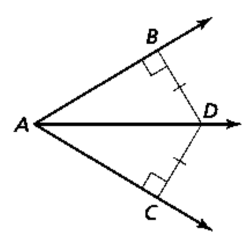
from the two __________ of the angle.



Converse of the Angle Bisector Theorem

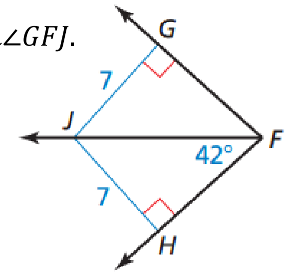
If a point is in the ______________ of an angle and is ________________

from the two sides of the angle, then it lies on the _____________ of the angle.

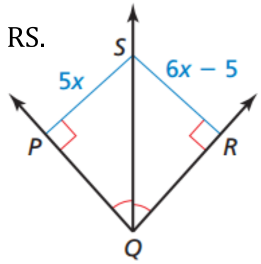


Examples:

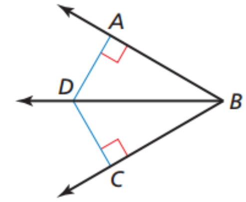
4. Find $m\angle GFJ$.



5. Find RS.



6. Find $m\angle ABC$ when AD = 3.2, CD = 3.2 and $m\angle DBC = 39°$



Writing Equations of Perpendicular Bisectors

Example: Write an equation of the perpendicular bisector of the segment with endpoints P(-2, 3) and Q(4, 1)

Step 1: Find the midpoint of the original segment. Why? ______________________________________

Step 2: Find the slope of the original segment. Why? ____

Step 3: Find the slope of the segment *perpendicular* to the original segment. How? ____________________

Step 4: Write the equation.

Use point-slope form (________________) OR slope-intercept form (_________________)