Lesson 6.1 and 6.2 Perpendicular & Angle Bisectors

Sunday, February 5, 2023 7:40 PM

Click Link Below for Interactive Pear Deck Powerpoint

https://app.peardeck.com/student/ticecmefs

Lesson 6.1 and 6.2

Lesson 6.1 Perpendicular Bisectors

Lesson 6.2 Angle Bisectors

Content Objective

Students solve problems using perpendicular bisectors in triangles.

Students solve problems using angle bisectors.

Florida's B.E.S.T. Standards for Mathematics

MA.912.GR.1.1 Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.

MA.912.GR.3.3 Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.

MA.912.GR.5.2 Construct the bisector of a segment or an angle, including the perpendicular bisector of a line segment.

Learning Intent (Target): *Today I will* be able to use perpendicular bisectors to find measures. Use angle bisectors to find measures and distance relationships. Write equations for perpendicular bisecto

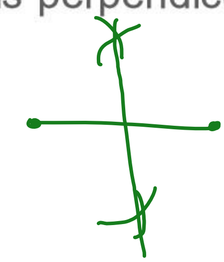
Success Criteria: *I'll know I'll have it when* I can accurately determine measures of the distance between segments of perpendicular bisectors and angle bisectors.

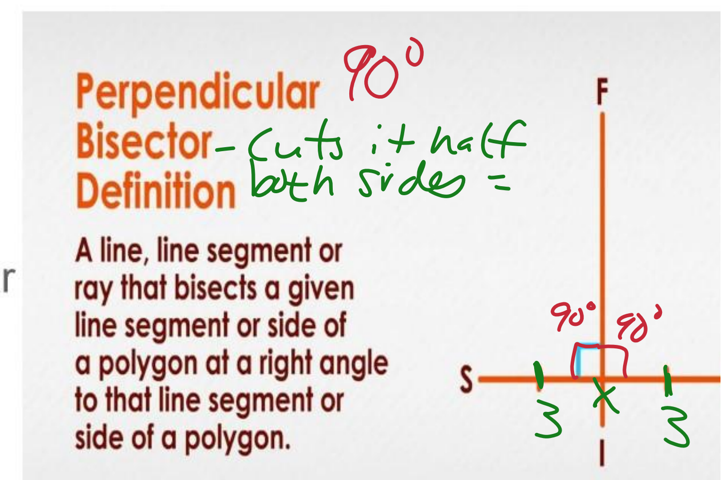
Accountable Team Task: *Therefore, I can* practice using interactive powerpoint for notes and invstigations using geogebra .

Learn

Perpendicular Bisectors of Segments

A **perpendicular bisector** is a line, segment, or ray that passes through the midpoint of a segment and is perpendicular to that segment.





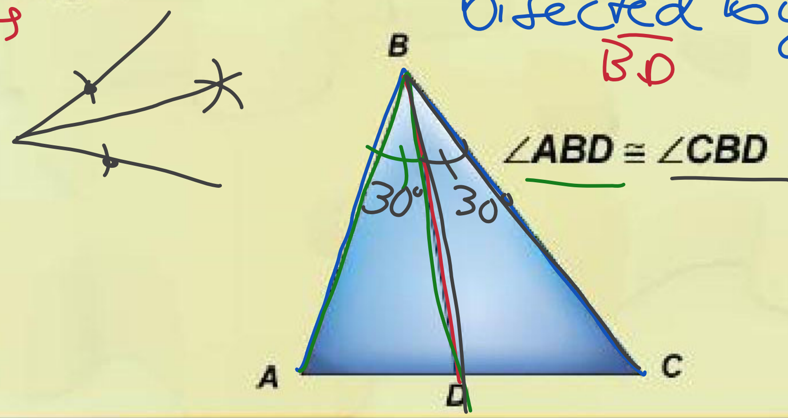
Students, draw anywhere on this slide!

Definition

Angle Bisector of a Triangle	**A line or line segment that divides an interior angle of a triangle into two equal angles.**

cuts it into 2 = parts

∠ABC is bisected by $\overline{BD}$



Students, draw anywhere on this slide!

Pear Deck Interactive Slide
Do not remove this bar

Click the link below to complete the Geogebra Investigations

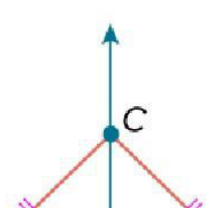
Students browse: https://www.geogebra.org/classic

Pear Deck Interactive Slide
Do not remove this bar

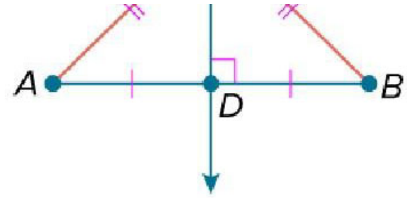
Learn
Perpendicular Bisectors of Segments

Theorem 6.1: Perpendicular Bisector Theorem

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



	equidistant from the endpoints of the segment.
Example	If $\overline{CD}$ is a $\perp$ bisector of $\overline{AB}$, then $AC = BC$.



Learn
Perpendicular Bisectors of Segments

Theorem 6.2: Converse of the Perpendicular Bisector Theorem

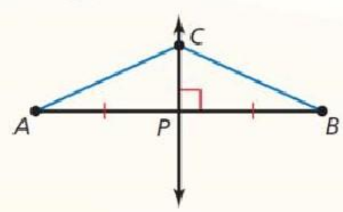
Words	If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.
Example	In the triangle above, if $AC = BC$, then C lies on the $\perp$ bisector of $\overline{AB}$.

Theorems

Theorem 6.1 Perpendicular Bisector Theorem

In a plane, if a point lies on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

If $\overleftrightarrow{CP}$ is the $\perp$ bisector of $\overline{AB}$, then $CA = CB$.

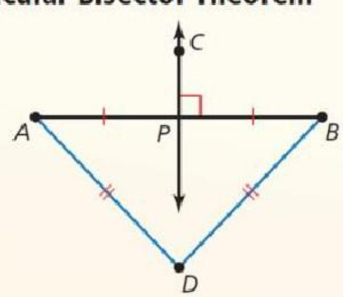


Proof p. 302

Theorem 6.2 Converse of the Perpendicular Bisector Theorem

In a plane, if a point is equidistant from the endpoints of a segment, then it lies on the perpendicular bisector of the segment.

If $DA = DB$, then point D lies on the $\perp$ bisector of $\overline{AB}$.



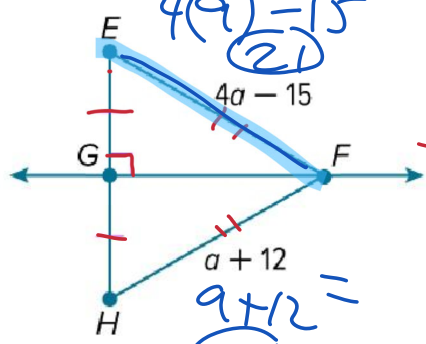
Proof Ex. 32, p. 308

Example 1
Use the Perpendicular Bisector Theorem

Find *EF*. 21

~~25~~

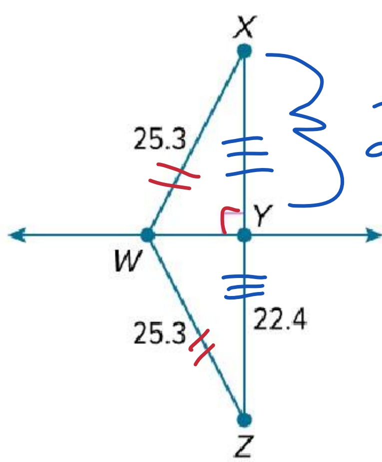
~~22~~



$$4a - \cancel{15} = a + 12$$
$$+\cancel{15} \qquad +15$$
$$4a = \cancel{a} + 27$$
$$-1a \qquad -\cancel{a}$$
$$\frac{3a}{3} = \frac{27}{3}$$
$$a = 9$$

Example 2
Use the Converse of the Perpendicular Bisector Theorem

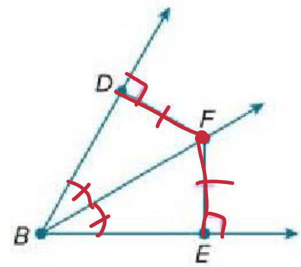
Find *XY*.



Learn
Angle Bisectors

Theorem 6.5: **Converse of the Angle Bisector Theorem**

Words	If a point in the interior of an angle is equidistant

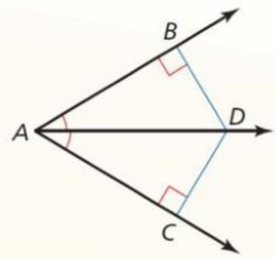
Words	If a point in the interior of an angle is equidistant from the sides of the angle, then it is on the bisector of the angle.
Example	If $\overline{FD} \perp \overrightarrow{BD}$, $\overline{FE} \perp \overrightarrow{BE}$, and $DF = FE$, then $\overrightarrow{BF}$ bisects $\angle DBE$. 

Theorems

Theorem 6.3 Angle Bisector Theorem

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

If $\overrightarrow{AD}$ bisects $\angle BAC$ and $\overline{DB} \perp \overrightarrow{AB}$ and $\overline{DC} \perp \overrightarrow{AC}$, then $DB = DC$.

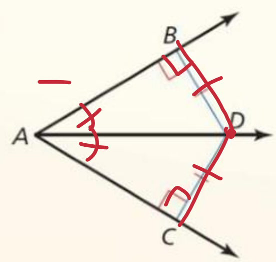


Proof Ex. 33(a), p. 308

Theorem 6.4 Converse of the Angle Bisector Theorem

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

If $\overline{DB} \perp \overrightarrow{AB}$ and $\overline{DC} \perp \overrightarrow{AC}$ and $DB = DC$, then $\overrightarrow{AD}$ bisects $\angle BAC$.



Proof Ex. 33(b), p. 308

Example 1

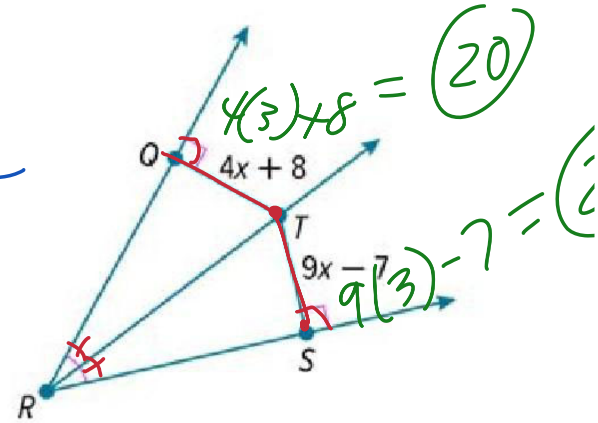
Use the Angle Bisector Theorem

20

Find *QT*.

$4x + 8 = 9x - 7$
$-4x \quad -4x$
$8 = 5x - 7$
$+7 \quad +7$
$15 = 5x$

$4x$
$-9x$
$-5x + 8 = -7$
$-8 \quad -8$
$-5x = -15$



$\frac{-5}{-5}$ $\frac{-5}{-5}$ $\rightarrow$ $3 = x$

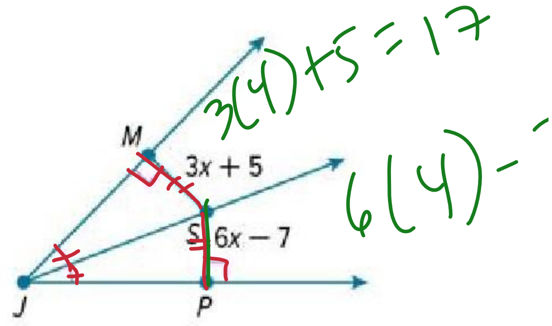
Example 1
Use the Angle Bisector Theorem

Check

Find *SP*.

17

$$3x + 5 = 6x - 7$$
$$\underline{-3x \qquad\qquad -3x}$$
$$5 = 3x - 7$$
$$\underline{+7 \qquad\qquad +7}$$
$$\frac{12}{3} = \frac{3x}{3}$$
$$4 = x$$

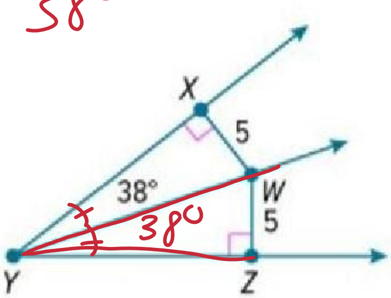


Students, draw anywhere on this slide!
Pear Deck Interactive Slide
Do not remove this bar

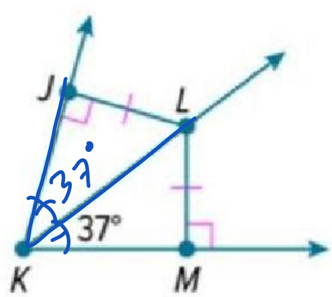
Example 2
Use the Converse of the Angle Bisector Theorem

Find $m\angle ZYW$.

38°



Find $m\angle JKL$.



Students, draw anywhere on this slide!
Pear Deck Interactive Slide
Do not remove this bar