Lesson 6.1 and 6.2 Perpendicular & Angle Bisectors

Wednesday, January 29, 2025 10:00 PM

Click link below for interactive Pear Deck PowerPoint Lesson:

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

GEO 6.1 and 6.2 Angle

6.1 Perpendicular Bisectors

6.2 Angle Bisectors

Content Objective
Students solve problems using angle bisectors.

Content Objective
Students solve problems using perpendicular bisectors in triangles.

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.

Learn

Perpendicular Bisectors of Segments

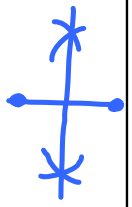
A **perpendicular bisector** is a line, segment, or ray that passes through the midpoint of a segment and is perpendicular to that segment.

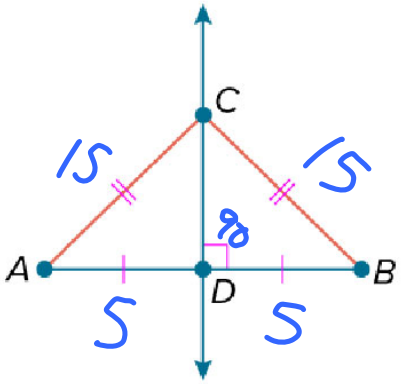
You can use various tools to construct the perpendicular bisector of a segment. To use string, start by wrapping the end of the string around a pencil. Use a thumbtack to fix the string to a point.

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





McGraw Hill | Perpendicular Bisectors

This material may be reproduced for licensed classroom use only and may not be further reproduced or distributed.

Learn
Perpendicular Bisectors of Segments

Theorem 6.2: Converse of the Perpendicular Bisector Theorem

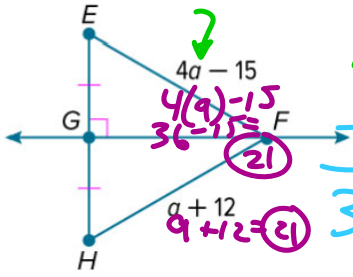
Words	If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.
Example	In the triangle above, if $AC = BC$, then C lies

Example	In the triangle above, if $AC = BC$, then C lies on the $\perp$ bisector of $\overline{AB}$.

Example 1

Use the Perpendicular Bisector Theorem

Find *EF*.



$4a - 15 = a + 12$

$-a \quad -a$

$3a - 15 = 12$

$+15 \quad +15$

$\frac{3a}{3} = \frac{27}{3}$

$a = 9$

$4(9) - 15$

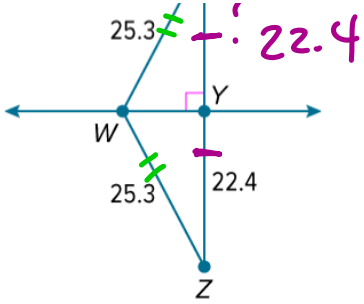
$36 - 15 = 21$

$9 + 12 = 21$

Example 2

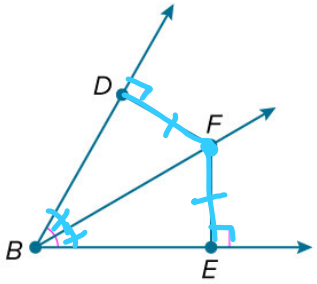
Use the Converse of the Perpendicular Bisector Theorem

Find *XY*.



Learn
Angle Bisectors

Theorem 6.4: Angle Bisector Theorem

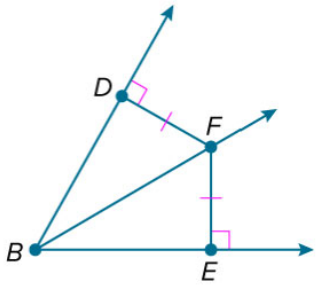
Words	If a point is on the bisector of an angle, then it is equidistant from the sides of the angle.
Example	If $\overrightarrow{BF}$ bisects $\angle DBE$, $\overline{FD} \perp \overrightarrow{BD}$, and $\overline{FE} \perp \overrightarrow{BE}$, then $DF = FE$. 

McGraw Hill | Perpendicular Bisectors

This material may be reproduced for licensed classroom use only and may not be further reproduced or distributed.

Learn
Angle Bisectors

Theorem 6.5: Converse of the Angle Bisector Theorem

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 $\angle DBE$. 

Example 1
Use the Angle Bisector Theorem

Find *QT*.

$4x + 8 = 9x - 7$

$-4x \quad -4x$

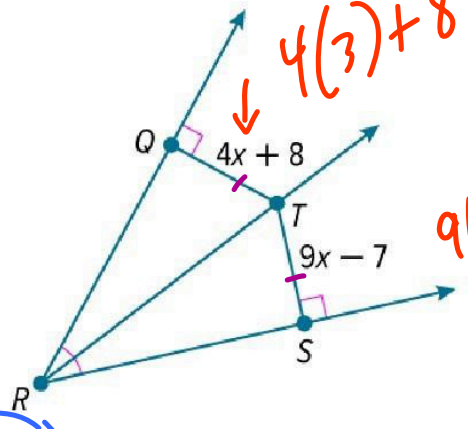
$8 = 5x - 7$

$+7 \quad +7$

$15 = 5x$

$\frac{15}{5} = \frac{5x}{5}$

$x = 3$



$4(3) + 8 = 20$

$9(3) - 7 = 20$ ✓

Example 1
Use the Angle Bisector Theorem

Check

Find *SP*.

$3x+5=6x-7$

$+7 \quad +7$

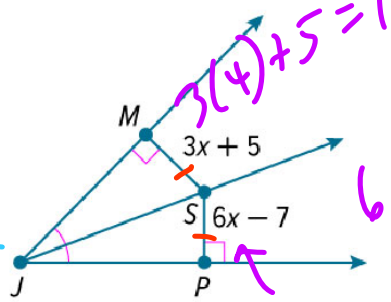
$3x+12=6x$

$-3x \quad -3x$

$12=3x$

$\frac{12}{3}=\frac{3x}{3}$

$x=4$

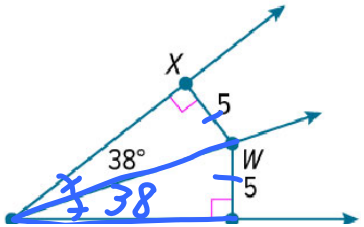


$3(4)+5=17$ ✓

$6(4)-7=17$

Example 2
Use the Converse of the Angle Bisector Theorem

Find *m∠ZYW*.



$x=38$

Y Z

Example 2

Use the Converse of the Angle Bisector Theorem

Check

Find $m\angle JKL$.