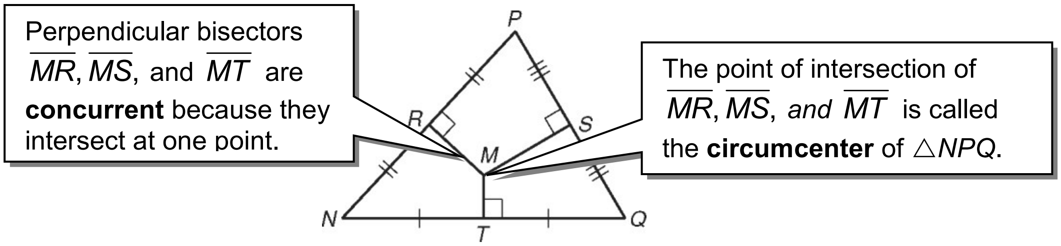
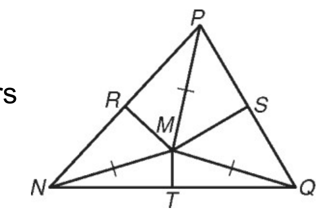
Name ________________________ Date ______________ Class ______________

LESSON 5-2

Reteach

Bisectors of Triangles

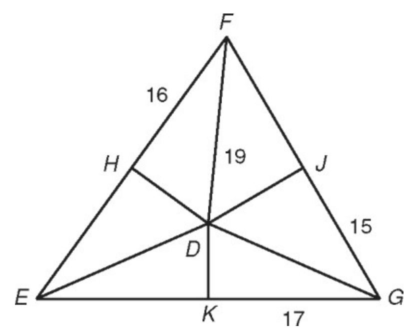


Theorem	Example
Circumcenter Theorem The circumcenter of a triangle is equidistant from the vertices of the triangle.	**Given:** $\overline{MR}$, $\overline{MS}$, and $\overline{MT}$ are the perpendicular bisectors of $\triangle NPQ$. **Conclusion:** $MN = MP = MQ$ 

If a triangle on a coordinate plane has two sides that lie along the axes, you can easily find the circumcenter. Find the equations for the perpendicular bisectors of those two sides. The intersection of their graphs is the circumcenter.

$\overline{HD}$, $\overline{JD}$, and $\overline{KD}$ are the perpendicular bisectors of $\triangle EFG$.

Find each length.



1. *DG* ____________________
2. *EK* ____________________
3. *FJ* ____________________
4. *DE* ____________________

Find the circumcenter of each triangle.

5. 

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6. 

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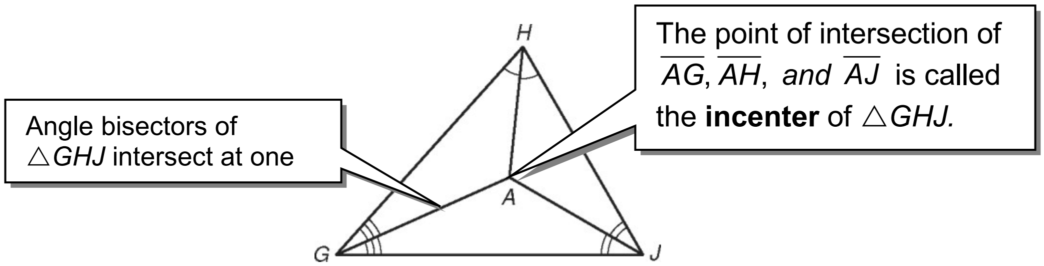
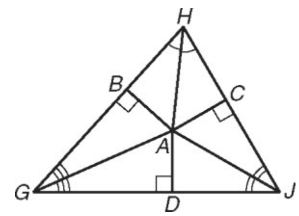
LESSON 5-2

Reteach

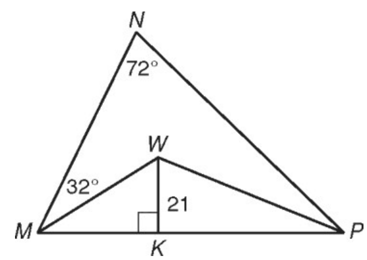
Bisectors of Triangles continued



Theorem	Example
Incenter Theorem The incenter of a triangle is equidistant from the sides of the triangle.	**Given:** $\overline{AG}$, $\overline{AH}$, and $\overline{AJ}$ are the angle bisectors of △*GHJ*. **Conclusion:** $AB = AC = AD$ 

$\overline{WM}$ and $\overline{WP}$ are angle bisectors of △*MNP*, and $WK = 21$.

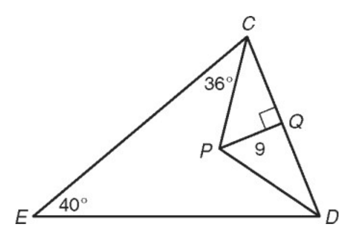
Find m∠*WPN* and the distance from *W* to $\overline{MN}$ and $\overline{NP}$.



$m\angle NMP = 2m\angle NMW$	Def. of ∠ bisector
$m\angle NMP = 2(32°) = 64°$	Substitute.
$m\angle NMP + m\angle N + m\angle NPM = 180°$	△ Sum Thm.
$64° + 72° + m\angle NPM = 180°$	Substitute.
$m\angle NPM = 44°$	Subtract 136° from each side.
$m\angle WPN = \frac{1}{2}m\angle NPM$	Def. of ∠ bisector
$m\angle WPN = \frac{1}{2}(44°) = 22°$	Substitute.

The distance from *W* to $\overline{MN}$ and $\overline{NP}$ is 21 by the Incenter Theorem.

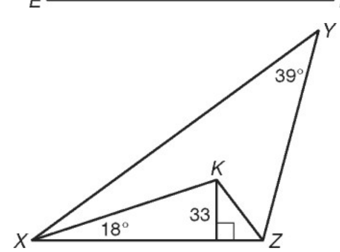
$\overline{PC}$ and $\overline{PD}$ are angle bisectors of △*CDE*. Find each measure.



7. the distance from *P* to $\overline{CE}$ ____________________

8. m∠*PDE* ____________________

$\overline{KX}$ and $\overline{KZ}$ are angle bisectors of △*XYZ*. Find each measure.

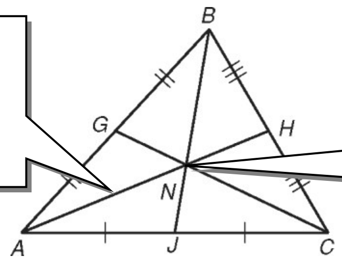


9. the distance from *K* to $\overline{YZ}$ ____________________

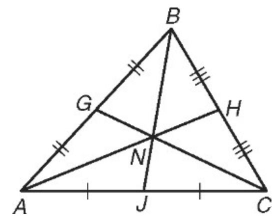
10. m∠*KZY* ____________________

Medians and Altitudes of Triangles

$\overline{AH}, \overline{BJ}$, and $\overline{CG}$ are **medians of a triangle.** They each join a vertex and the midpoint of the opposite side.



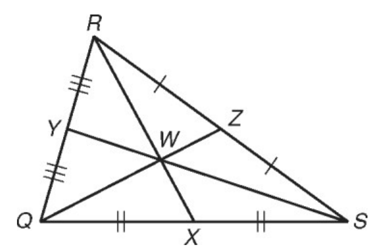
The point of intersection of the medians is called the **centroid** of $\triangle ABC$.

Theorem	Example
Centroid Theorem The centroid of a triangle is located $\frac{2}{3}$ of the distance from each vertex to the midpoint of the opposite side.	 **Given:** $\overline{AH}, \overline{CG}$, and $\overline{BJ}$ are medians of $\triangle ABC$. **Conclusion:** $AN = \frac{2}{3}AH$, $CN = \frac{2}{3}CG$, $BN = \frac{2}{3}BJ$

In $\triangle ABC$ above, suppose $AH = 18$ and $BN = 10$. You can use the Centroid Theorem to find AN and BJ.

$AN = \frac{2}{3}AH$	Centroid Thm.	$BN = \frac{2}{3}BJ$	Centroid Thm.
$AN = \frac{2}{3}(18)$	Substitute 18 for *AH*.	$10 = \frac{2}{3}BJ$	Substitute 10 for *BN*.
$AN = 12$	Simplify.	$15 = BJ$	Simplify.

In $\triangle QRS$, $RX = 48$ and $QW = 30$. Find each length.



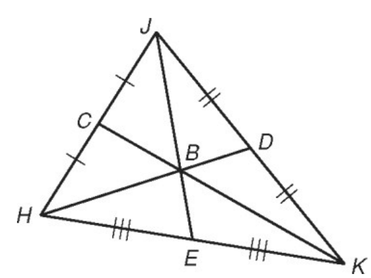
1. *RW* ____________________

2. *WX* ____________________

3. *QZ* ____________________

4. *WZ* ____________________

In $\triangle HJK$, $HD = 21$ and $BK = 18$. Find each length.



5. *HB* ____________________

6. *BD* ____________________

7. *CK* ____________________

8. *CB* ____________________

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