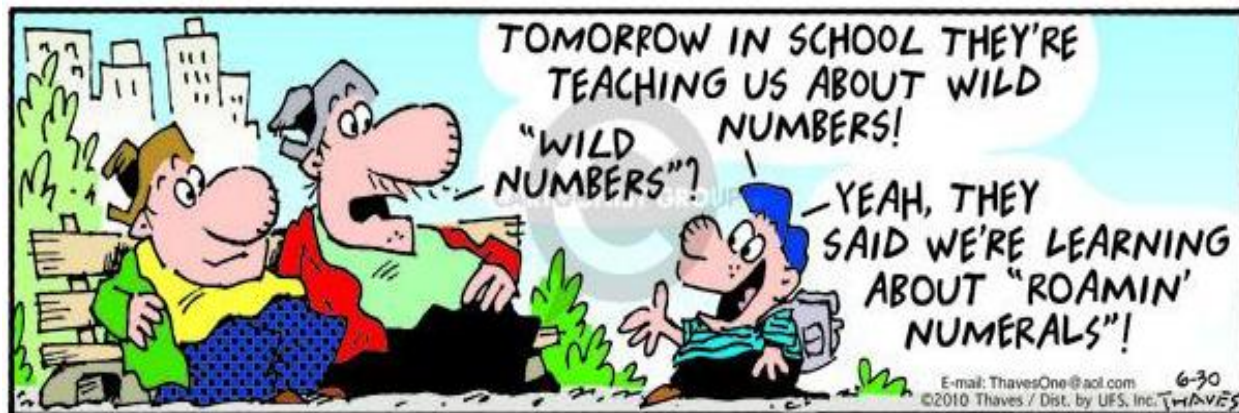


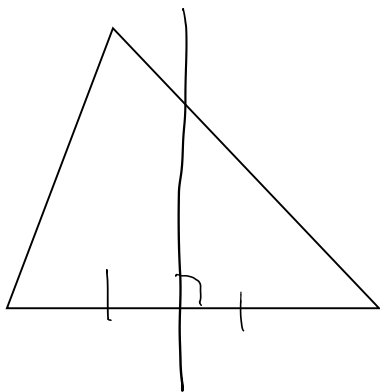
Goals aligned to the Common Core State Standards:

- You will identify and use perpendicular bisectors, angle bisector, medians, and altitudes in triangles.
- You will use the perpendicular bisector theorem and the centroid theorem.
- MP 1, 2, 5, 7

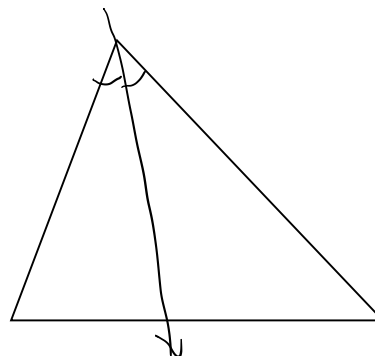
5.1 & 5.2 Bisectors, Medians, and Altitudes of Triangles



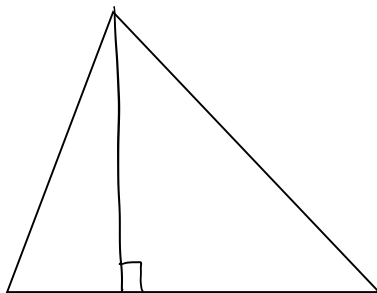
Perpendicular bisector



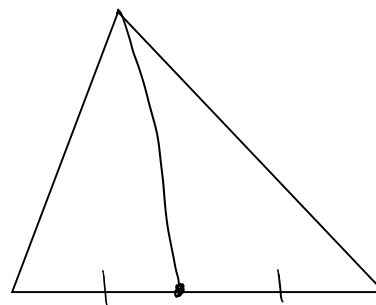
Angle Bisector







Altitude



Median



Point of Concurrency

perpendicular bisector		circumcenter
angle bisector		incenter
median		centroid
altitude		orthocenter

REMEMBER:

Perpendicular Bisector

- Creates 90
- Goes through midpoint
- Point on the \perp bisector is
- Equidistant from the endpoints of the segment.

Median

- Goes through midpoint, vertex
- Centroid splits lines $\frac{1}{3}$ and $\frac{2}{3}$

Angle Bisector

- Splits angle in two \cong parts

Altitude

- Goes through Vertex
- Creates 90

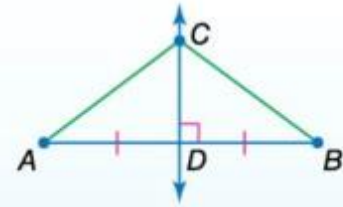
Theorems

Perpendicular Bisectors

5.1 Perpendicular Bisector Theorem

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

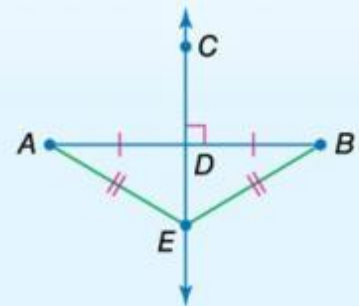
Example If \overline{CD} is a \perp bisector of \overline{AB} , then $AC = BC$.



5.2 Converse of the Perpendicular Bisector Theorem

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

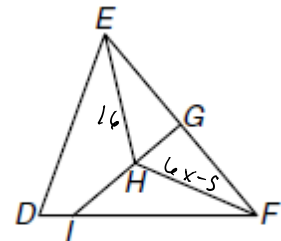
Example If $AE = BE$, then E lies on \overline{CD} , the \perp bisector of \overline{AB} .



ALGEBRA In $\triangle DEF$, \overline{GI} is a perpendicular bisector.

7. Find x if $EH = 16$ and $FH = 6x - 5$.

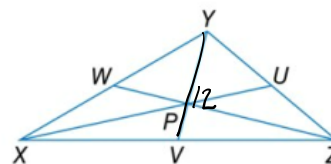
$$\begin{aligned} 16 &= 6x - 5 \\ \frac{21}{6} &= \frac{6x}{6} \\ 2\frac{1}{6} &= x \end{aligned}$$



EXAMPLE 1 Use the Centroid Theorem

In $\triangle XYZ$, P is the centroid and $YV = 12$. Find YP and PV .

$$\begin{aligned} YP &= \frac{2}{3} \cdot 12 = 8 \\ PV &= \frac{1}{3} \cdot 12 = 4 \end{aligned}$$



EXAMPLE 2**Use the Centroid Theorem**

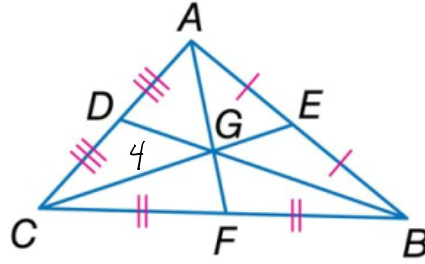
In $\triangle ABC$, $CG = 4$. Find GE .

$$GE = \frac{1}{3} \text{ of } CE$$

$$CG = \frac{2}{3} \text{ of } CE$$

$$\uparrow$$

$$(4) \text{ So } GE = 2$$

**EXAMPLE 1****Check Your Progress**

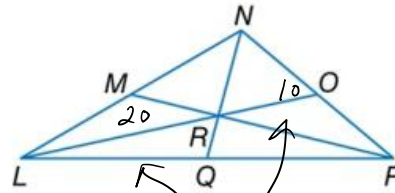
In $\triangle LNP$, R is the centroid and $LO = 30$. Find LR and RO .

A. $LR = 15$; $RO = 15$

B. $LR = 20$; $RO = 10$

C. $LR = 17$; $RO = 13$

D. $LR = 18$; $RO = 12$



$$\frac{30}{3} = 10$$

$$10 \times 2 = 20$$

EXAMPLE 2**Check Your Progress**

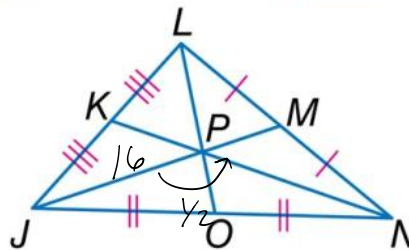
In $\triangle JLN$, $JP = 16$. Find PM .

A. 4

B. 6

C. 16

D. 8

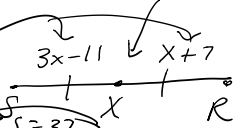


ALGEBRA In $\triangle PRS$, \overline{PT} is an altitude and \overline{PX} is a median.

5. Find RS if $RX = x + 7$ and $SX = 3x - 11$.

$3x - 11 = x + 7$
 $2x = 18$
 $x = 9$

$SX = 16, RX = 16$
 $RS = 32$



6. Find RT if $RT = x - 6$ and $m\angle PTR = 8x - 6$.

$x - 6 = 90$ (altitude)

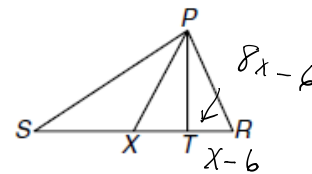
$x - 6 = 90$
 $+6 \quad +6$

$\frac{8x}{8} = \frac{96}{8}$

$x = 12$

$RT = 12 - 6$

$RT = 6$



ALGEBRA In $\triangle DEF$, \overline{GI} is a perpendicular bisector.

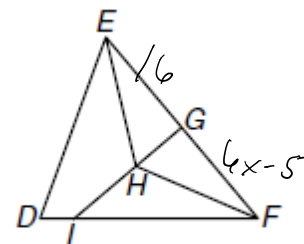
7. Find x if $\overline{EG} = 16$ and $\overline{GF} = 6x - 5$.

~~EG~~
~~GF~~

$16 = 6x - 5$

$\frac{21}{6} = \frac{6x}{6}$

$\frac{21}{6} = x$



Goals aligned to the Common Core State Standards:

- You can identify and use perpendicular bisectors, angle bisector, medians, and altitudes in triangles.
- You can use the perpendicular bisector theorem and the centroid theorem.

Homework:

5.1/5.2 Altitude, Median, Angle bisector, perpendicular bisector wkst,
centroid wkst

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