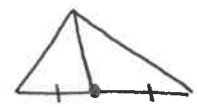
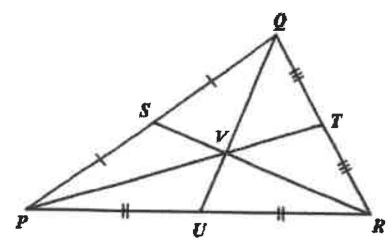
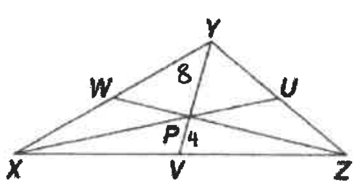
Median: a segment w/ endpoints being a vertex of a triangle and the midpoint of the opposite side



Centroid: the point of concurrency of the medians of a triangle

Centroid Theorem	The medians of a triangle intersect at a point called the centroid that is two thirds of the distance from each vertex to the midpoint of the opposite side	 $PV = \frac{2}{3}PT$ $QV = \frac{2}{3}QU$ $RV = \frac{2}{3}RS$

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



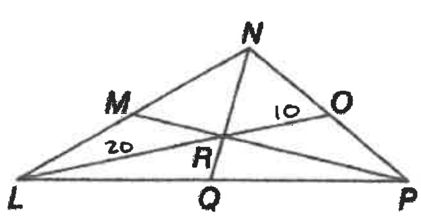
$YP = \frac{2}{3}(12)$

$= \frac{2}{\cancel{3}_1} \cdot \frac{\cancel{12}^4}{1}$

$\boxed{= 8}$

$\boxed{PV = 4}$

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



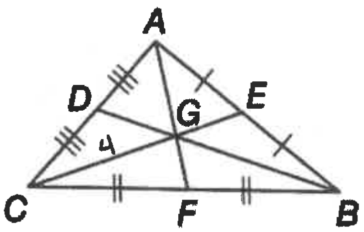
$LR = \frac{2}{3}(30)$

$LR = \frac{2}{\cancel{3}_1} \cdot \frac{\cancel{30}^{10}}{1}$

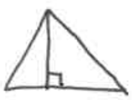
$\boxed{= 20}$

$\boxed{RO = 10}$

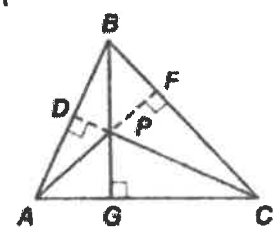
2. In $\triangle ABC$ $CG = 4$. Find $GE =$



$\boxed{GE = 2}$

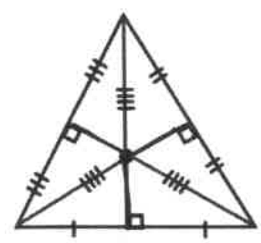


Altitude: a segment from a vertex to the line containing the opposite side and perpendicular to that line.

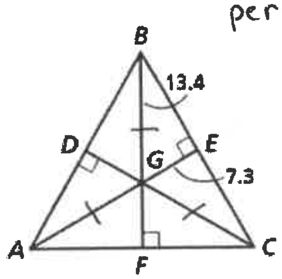


Orthocenter: point of concurrency of the altitudes

point of concurrency of perp bisectors

Circumcenter Theorem	The vertices of a triangle are equidistant from the circumcenter.	

3. G is the circumcenter of ΔABC.
Find $GC =$

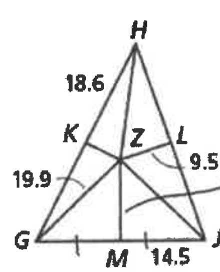


perp bisectors $\overline{EG}$, $\overline{DG}$, $\overline{FG}$

by thm
BG = GC = AG
13.4 = GC = AG

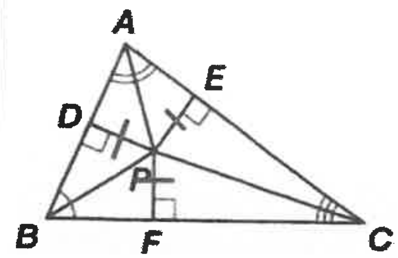
$\boxed{GC = 13.4}$

5. Z is the circumcenter of ΔGJH.
Find $GM =$

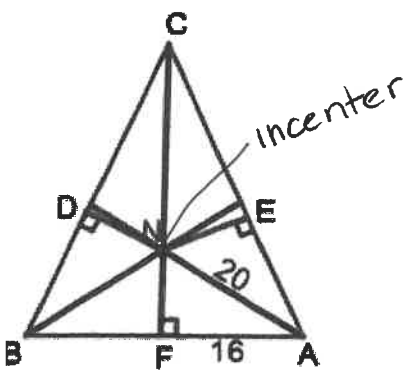


perp bisector → goes through midpoint

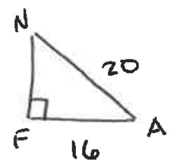
$\boxed{GM = 14.5}$

Incenter Theorem	The incenter of a triangle is equidistant from the sides of the triangle.	

6. N is the incenter of the triangle. Find ND:



ND = NE = NF



$(NF)^2 + (FA)^2 = (NA)^2$

$(NF)^2 + 16^2 = 20^2$

$(NF)^2 + 256 = 400$

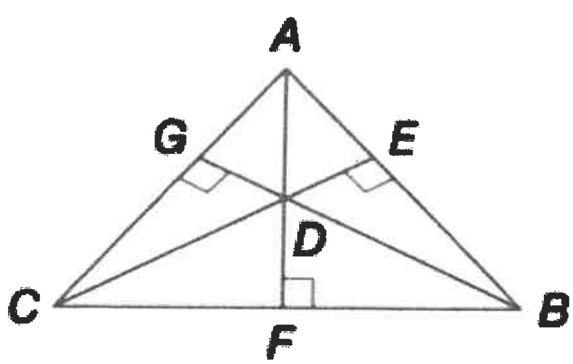
$-256 \quad -256$

$\sqrt{(NF)^2} = \sqrt{144}$

$\boxed{NF = 12}$

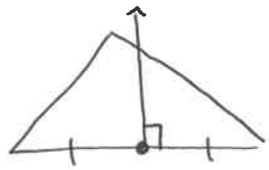
$\boxed{ND = 12}$

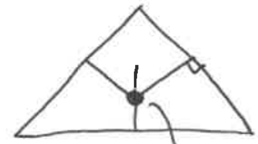
7. In the figure point D is the incenter. Determine which segments are congruent to $\overline{DG}$.



GD = DE = FD

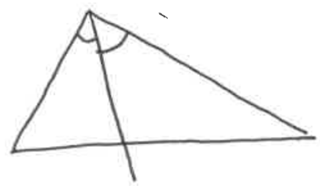
perp bisector

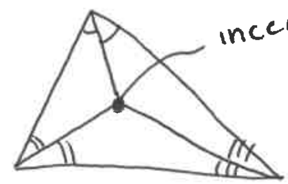




circumcenter

angle bisector





incenter