5.4 Warm-Up:

Make a list of the different types of segments that we have learned about within a triangle.

List the characteristics of each and draw a representation that supports the characteristics.

1. midsegments

1/2 of the 3rd side & parallel to it or one that's left

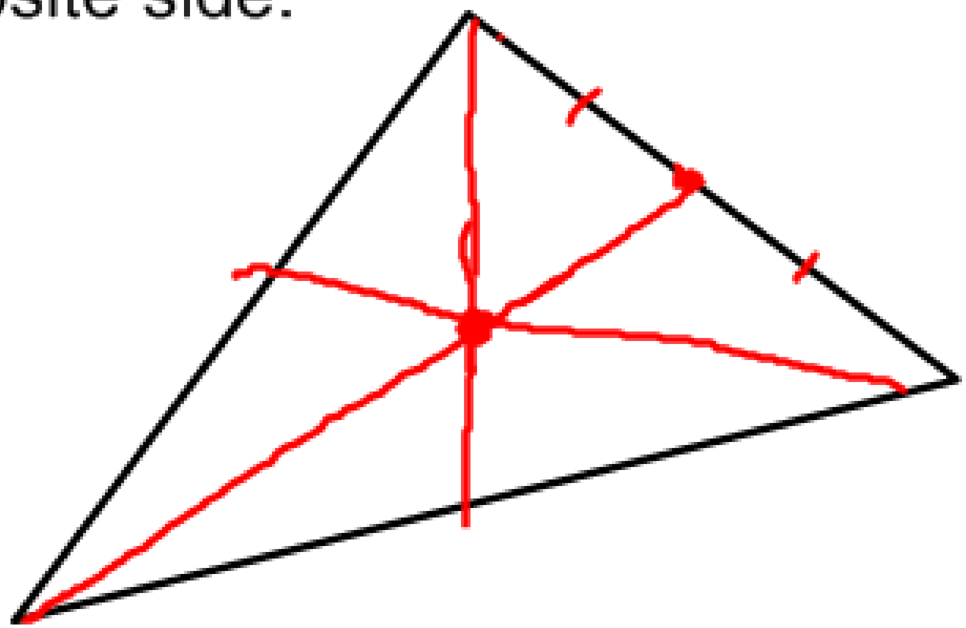
2. ⊥ bisectors

C is circumcenter it is equidistant from the vertices.

3. ∠ bisectors

I is the incenter, it is equidistant from the sides.

median of a triangle - segment from a vertex to the midpoint of the opposite side.



Draw the medians on a triangle.
Are they concurrent?

centroid- pt of concurrency of the medians

Measurements of the medians:

	median length	vertex to centroid	centroid to midpt
1	24	16	8
2	19	12.5	6.5
3	12	8	4

$2\,cm = VC$

$VC \tfrac{1}{2} = cm$

$3cm = \text{whole}$

$VC = \tfrac{2}{3}\,\text{whole}$

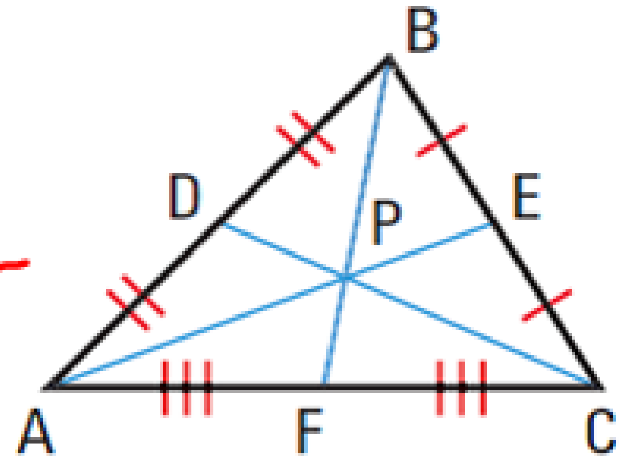
	$\frac{\text{vertex to centroid}}{\text{median length}}$	$\frac{\text{centroid to midpt}}{\text{vertex to centroid}}$
1	$\frac{16}{24} = .\overline{6}$	$\frac{8}{16} = \frac{1}{2}$
2	$\frac{12.5}{19} = .66$	$\frac{6.5}{12.5} = .52$
3	$\frac{8}{12} = .\overline{6}$	$\frac{4}{8} = \frac{1}{2}$

$\frac{2}{3}$

Concurrency of Medians of a Triangle (Thm)

The medians of a triangle intersect at a point (the centroid) that is ___2/3___ of the distance from each vertex to the midpoint of the opposite side.

Centroid to vertex is $\frac{2}{3}$ of the whole.

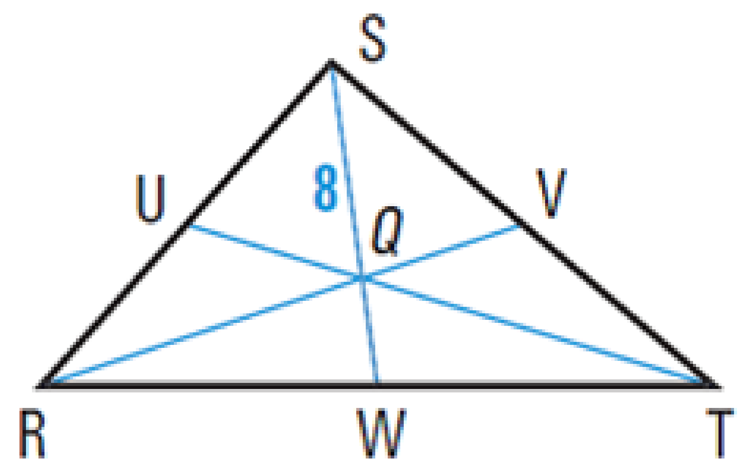


$AP = \frac{2}{3} AE$

$2PE = AP$ -or- $PE = \frac{1}{2} AP$

$3PE = AE$

In $\triangle RST$, Q is the centroid and $SQ = 8$. Find QW and SW.



$QW = \frac{1}{2} SQ$

$QW = 4$

$SW = QW + SQ$

$= 4 + 8$

$= 12$

OR

$\frac{2}{3} SW = SQ$

$\frac{3}{2} \cdot \frac{2}{3} x = 8 \cdot \frac{3}{2}$

$x = 12$

altitude of a triangle- the height, the perpendicular segment from a vertex to the opposite side or to the line that contains the opposite side.

Concurrency of Altitudes of a Triangle (Thm)

The line containing the altitudes of a triangle are concurrent.

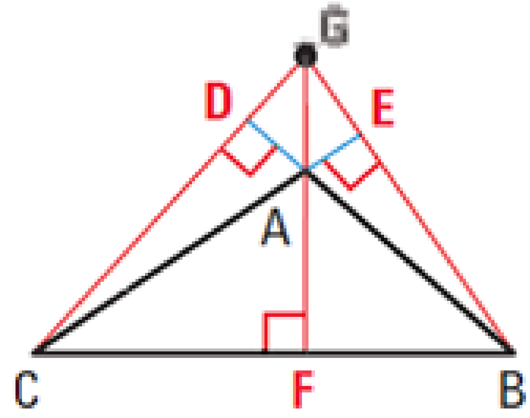
orthocenter

pt G

or

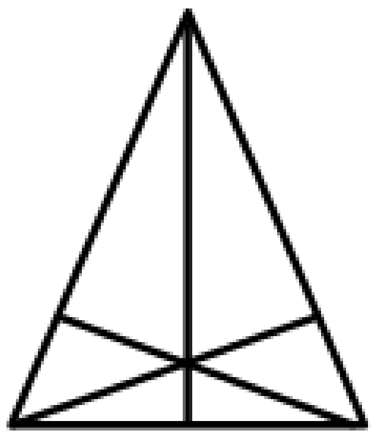
the pt of

concurrency of the altitudes.



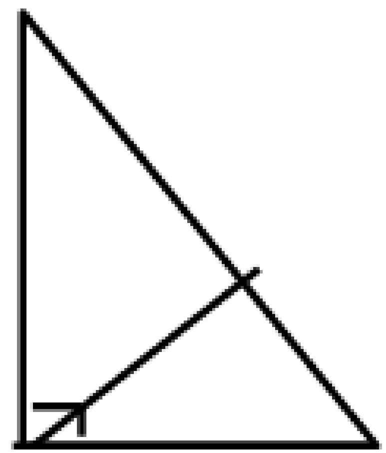
Find the ortocenters.

acute



orthocenter
is
inside

right

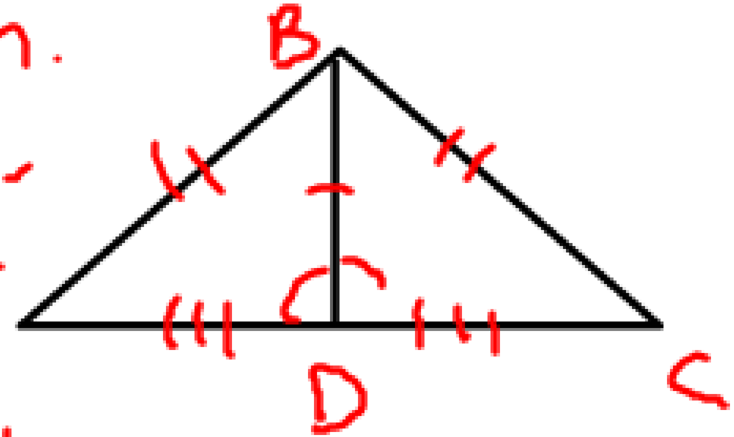


othocenter
is the
vertex of
the right ∠

obtuse

orthocenter
is
outside

Prove that the median to the base of an isosceles triangle is an altitude. $\overline{BD}$ is a median.



$\triangle ABC$ is isosceles.

$\overline{BD} \cong \overline{BD}$ by reflexive.

D is the midpt of $\overline{AC}$ by def of median.

$\overline{AB} \cong \overline{BC}$ by def of isosceles.

$\overline{AD} \cong \overline{DC}$ by def of midpt.

$\triangle ABD \cong \triangle CBD$ by SSS. $\angle ADB \cong \angle CDB$ by CP$\cong\triangle$. $\overline{BD}$ is an altitude by Thm 3.9 (linear pair, def of altitude).

How could we prove the median is an angle bisector?

Homework:

p 322
#'s 2-7, 11-16,
18-26 E, 40, 42a

Quiz next time!!