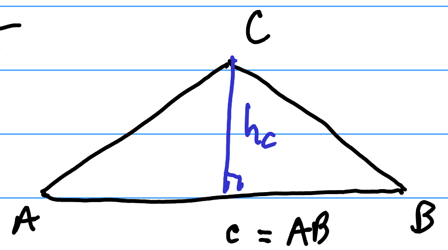
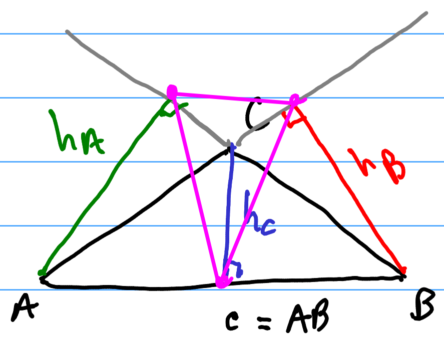
§1.3 – Prereq. Materials

RE. Read the defn's.

Defn. 1.3.5



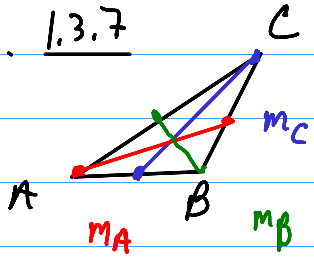
The altitude h_c is the line segment through the vertex C that is perpendicular to the opp. side.



orthic triangle.

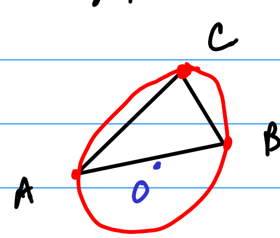
Defn. 1.3.6 The orthic triangle of $\triangle ABC$ is the triangle whose vertices are the int. points of the sides w/ the altitudes.

Defn. 1.3.7



The median of $\measuredangle C$ is the line segment through C that bisects AB.

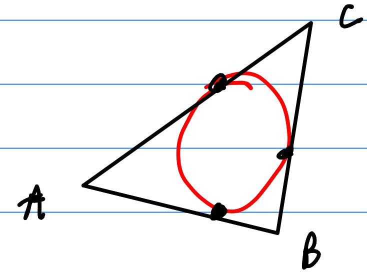
Defn. 1.3.8 Given a triangle ABC, there is one circle that passes through all 3 vertices.



This is the circumcircle of $\triangle ABC$.

The center of the circumcircle is the circumcenter of $\triangle ABC$.

Defn. 1.3.9 A circle is said __inscribed__ in a polygon if each side of the polygon is tangent to the circle.

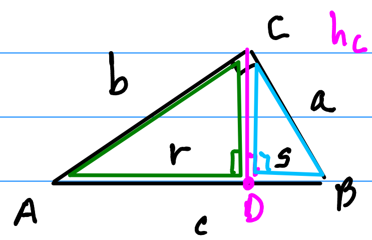


Inscribed circle or __incircle__.

Thm. 1.3.13 (Pythagorean) If a triangle ΔABC has a right angle at C, then

$$a^2 + b^2 = c^2.$$

Proof.



$c = r + s$

$\Delta ABC \sim \Delta ACD$ are similar: same angles!
the ratios of side lengths are equal:

from ΔABC $\frac{b}{c} = \frac{r}{b}$ in ΔACD
this implies $b^2 = cr$

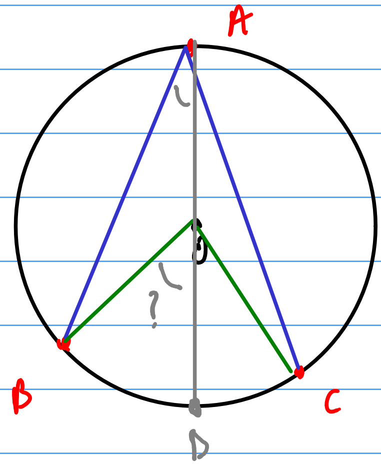
From the other, $\frac{a}{c} = \frac{s}{a}$
and $a^2 = cs$

Then, adding, we obtain

$$a^2 + b^2 = cs + cr = c(s+r) = c \cdot c = c^2$$

∎

Thm 1.3.14 – Star Trek Lemma



$\measuredangle BAC = \frac{1}{2} \measuredangle BOC$

where O is the center and A, B, C all lie on the circle.

TBS – $\measuredangle BAD = 2 \measuredangle BOD$.