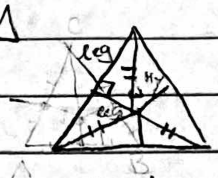
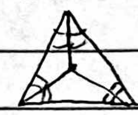
Sec 5.1 & 5.2

Th: The $\perp$ bisectors (3) of a triangle, intersect at a point called the <u>circumcenter</u>

** The Circumcenter is equidistant to the vertices of the Δ

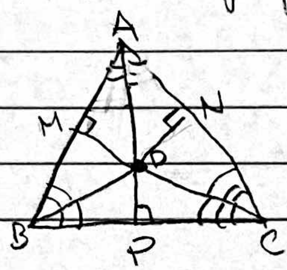
$a^2+b^2=c^2$





Th: The angle bisectors (3) of a Δ intersect at a point called the <u>INCENTER</u>

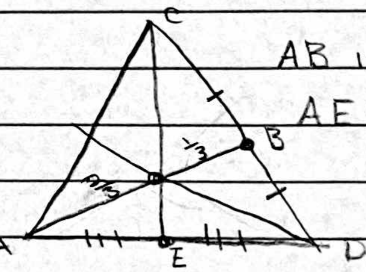
** The incenter is equidistant to the <u>sides</u> of a Δ



D is the incenter

$DM \cong DN \cong DP$

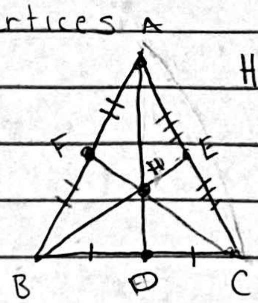
Th: The medians of a triangle intersect at a point called the <u>CENTROID</u>



AB is a median

AE is a median

** The Centroid is 2/3 the length to the vertices



H is the Centroid

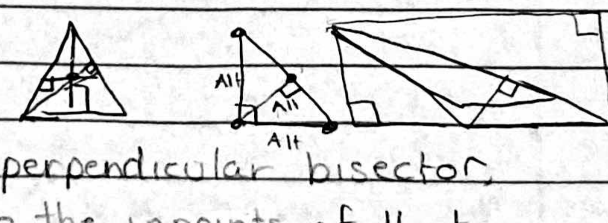
$\overline{HA}$ is 2/3 of the entire median

$HA = \frac{2}{3} AD \rightarrow HD = \frac{1}{3} AD$

$\overline{HB} = \frac{2}{3} BE \rightarrow HE$ is $\frac{1}{3}$ of BE

$CH = \frac{2}{3} CF \rightarrow HF$ is $\frac{1}{3}$ of CF

Th: The altitudes of a Δ intersect at a point called the orothocenter



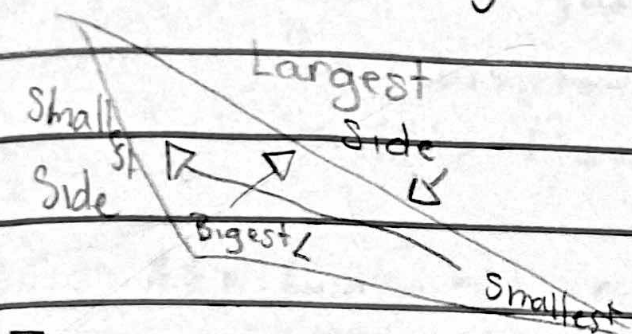
Th: If a point is on a perpendicular bisector, then it is equidistant to the inpoints of that segment

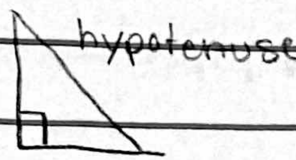
g: AD is a perpendicular bisector

c: $DC \cong DB$ $AB \cong AC$ } Because AD is a $\perp$ bisector

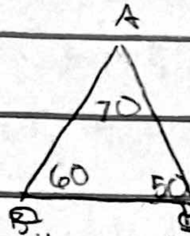
$MB \cong MC$

Sec. 5.3: Angle-Side Relationships in $\triangle$





Ex)

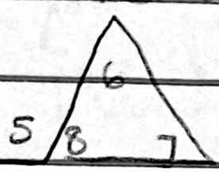


Watch this

List the sides largest to smallest

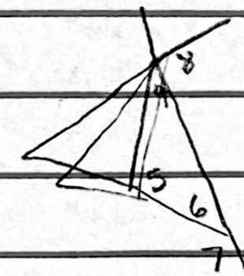
$\overline{CB}, \overline{AB}, \overline{AC}$

Th: An exterior $\angle$ of a $\triangle$ is greater than both the remote interior



$\angle 5 > \angle 6$ $\quad \angle 5 < 180°$

$\angle 5 > \angle 7$ $\quad \angle > 0$



less than $\angle 7 = \angle 7; \angle 4; \angle 6; \angle 2 + \angle 4$

Sec. 5.4:

Indirect Proofs: (Proof by contradiction)

- Assuming the opposite of what you are trying to $\boxed{\text{prove}}$ (1st Step)
- Write a paragraph proof making conclusions and giving reasons (Use given info and/or pic w/
- Look for a contradiction
- Every proof will end with

But this contradicts the known fact ______

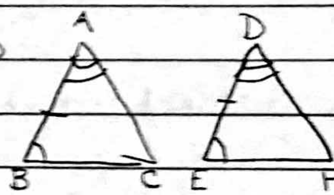
Therefore our assumption is false and thus ______.

Ex) g: $\angle A \cong \angle D$

$\overline{AB} \cong \overline{DE}$

$\overline{AC} \ncong \overline{DF}$

p: $\angle B \ncong \angle E$

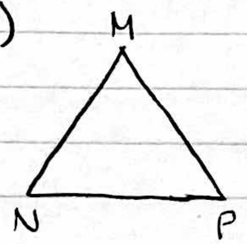


Assume $\angle B$ is $\cong \angle E$. By the given information I know that $\angle A \cong \angle D$, and $\overline{AB} \cong \overline{DE}$. Thus I now know that $\triangle BAC \cong \triangle EDE$ by ASA. Since the $\triangle$'s are $\cong$, AC is $\cong$ DF by CPCTC. But this contradicts the known fact that $AC \ncong DF$. Therefor our assumption is false and thus $\angle B \ncong \angle E$

Sec 5.5 ~ Δ Inequality Th^m:

Δ Inequality Th^m: For a Δ to exist, the sum of 2 sides must be greater than the 3^{rd}

Ex)



$NM + MP > NP$

$MP + NP > MN$

$MN + NP > MP$

Ex) Is this a Δ:

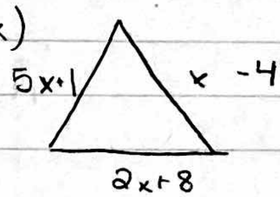
Sides are 6, 8, and 14 units

$14 + 8 > 6$ ✓

$14 + 6 > 8$ ✓

$6 + 8 > 14$ False

Ex)



$5x+1 + 2x+8 > x-4$

$7x+9 > x-4$

$\frac{6x}{6} > \frac{-13}{6}$

$x > -\frac{13}{6}$

$5x+1+x-4 > 2x+8$

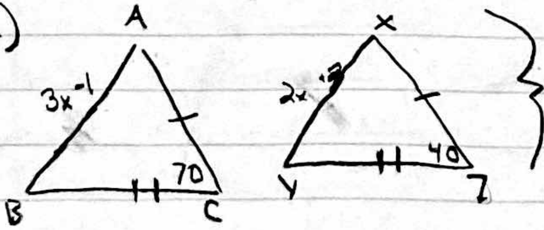
$6x-3 > 2x+8$

$2x+8+x-4 > 5x+1$

Sec 5.6 ~ Hinge Th^m:

Th^m: If 2 sides of a Δ are congruent to 2 sides of a 2^{nd} Δ and the included $\angle$ of the 1^{st} is bigger than the included $\angle$ of the 2^{nd}, then the 3^{rd} side of the 1^{st} Δ is greater than the 3^{rd} side of the 2^{nd} Δ

Ex)



We know:

$AB > XY$

Converse of Hinge:

If 2 sides of a Δ are congruent, to 2 sides of a 2nd Δ and the 3^{rd} side of the 1^{st} Δ is greater than the 3^{rd} side of the 2^{nd} triangle, then the included $\angle$ of the 1^{st} must be > than the included of the 2^{nd}