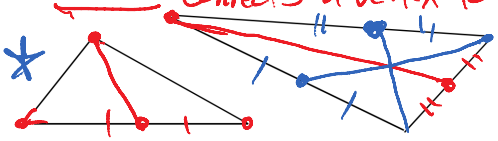
Geo
3.4

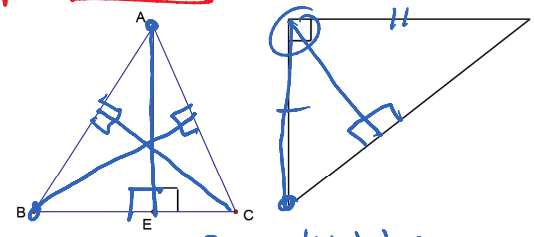
3.4 BEYOND CPCTC

Add 2 new definitions and a postulate to solve proofs beyond CPCTC

Medians: Connects a vertex to a midpt.



ALTITUDES: ⊥ to a side



Every triangle has 3 Medians.

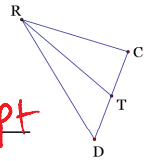
Every triangle has 3 Altitudes.

Definition (proofs):
1. Median → midpt
2. midpt → median

Definition (proofs):
1. Alt → ⊥
2. ⊥ → Alt.

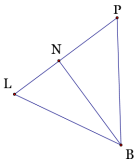
How will I use these in proofs?

EX. 1 Given: $\overline{RT}$ is a median



You can conclude T is a midpt

EX. 2 Given: $\overline{BN}$ is an altitude

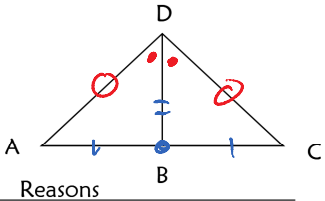


You can conclude $\overline{BN} \perp \overline{PL}$

EX. 3 Given: $\overline{CD} \cong \overline{AD}$
$\angle ADB \cong \angle CDB$

Conclusion: $\overline{DB}$ is the median to $\overline{AC}$

CPCTC

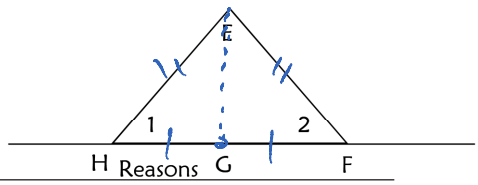


Statements		Reasons
1) $\overline{CD} \cong \overline{AD}$	(S)	1) Given
2) $\angle ADB \cong \angle CDB$	(A)	2) Given
3) $\overline{DB} \cong \overline{DB}$	(S)	3) Reflexive
4) $\triangle ADB \cong \triangle CDB$		4) SAS (1,2,3)
5) $\overline{AB} \cong \overline{BC}$		5) CPCTC
6) B is a midpt		6) 2 ≅ segs → midpt
7) $\overline{DB}$ is a median		7) midpt → median.

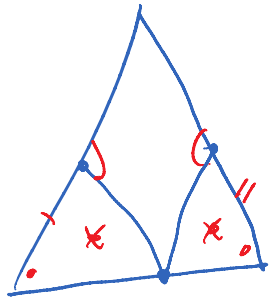
EX. 4 Given: G is the midpoint of $\overline{FH}$.

$\overline{EF} \cong \overline{EH}$

Prove: $\angle 1 \cong \angle 2$



Statements	Reasons

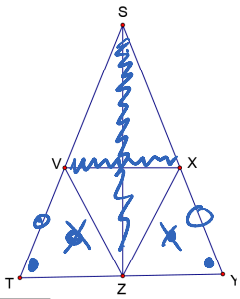


EX. 5 Given: $\angle T \cong \angle Y$

$\angle SVZ \cong \angle SXZ$

$\overline{TV} \cong \overline{YX}$

Prove: $\overline{SZ}$ is the median of $\overline{TY}$

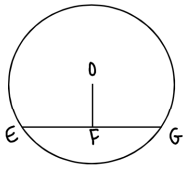


Statements	Reasons
1) $\angle T \cong \angle Y$ (A)	1) Given
2) $\angle SVZ \cong \angle SXZ$	2) Given
3) $\overline{TV} \cong \overline{YX}$ (S)	3) Given
4) $\angle SVT$ and $\angle SXY$ are 180°	4) Assumed
* 5) $\angle SVT \cong \angle SXY$	5) Same measure → $\cong$
6) $\angle TVZ \cong \angle YXZ$ (A)	6) Subtraction (2, 5)
7) $\triangle TVZ \cong \triangle YXZ$	7) ASA (1, 3, 6)
8) $TZ \cong ZY$	8) CPCTC
9) Z is a midpt	9) 2 $\cong$ segs → midpt
10) SZ is a Median	10) midpt → Median

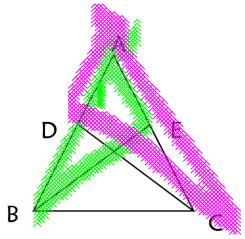
EX. 6 Given: F is the midpoint of EG

$\odot O$

Prove: $\measuredangle OEF \cong \measuredangle OGF$



EX. 7



Given: $\overline{CD}$ *and* $\overline{BE}$ *are altitudes of* ΔABC; $\overline{AD} \cong \overline{AE}$;

Prove: $\overline{DB} \cong \overline{EC}$

Statements	Reasons