Geometry Per/Date: 4 10/

Prove Triangle Congruency (4.6, 4.7 and a review of 4.1-4.5)

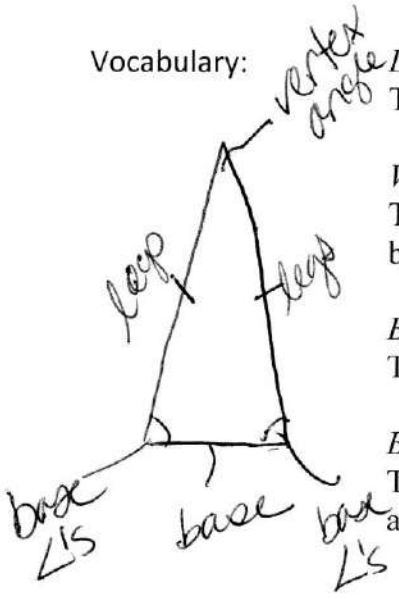
Warm Up: Any Questions, then quiz on 4.1 – 4.5

CW/HW Check: Triangle Congruence Worksheet (pp. 32-35)

Objective: Use theorems about triangles (including new ones about isosceles and equilateral triangles) to prove triangle congruence.

Standard: 5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.

Vocabulary:



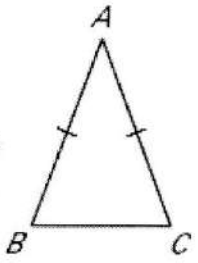
Legs
The legs of an isosceles triangle are the two congruent sides.

Vertex angle
The vertex angle of an isosceles triangle is the angle formed by the legs.

Base
The base of an isosceles triangle is the side that is not a leg.

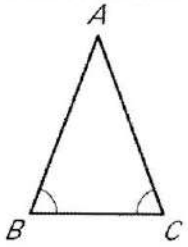
Base angles
The base angles of an isosceles triangle are the two angles adjacent to the base.

THEOREM 4.7: **BASE ANGLES THEOREM**



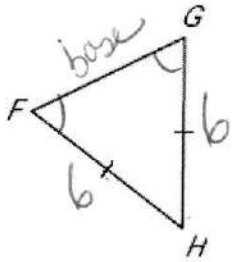
If two sides of a triangle are congruent, then the angles opposite them are congruent.
If $\overline{AB} \cong \overline{AC}$, then $\angle B \cong$ ∠C.

THEOREM 4.8: **CONVERSE OF BASE ANGLES THEOREM**



If two angles of a triangle are congruent, then the sides opposite them are congruent.
If $\angle B \cong \angle C$, then $\overline{AB} \cong$ $\overline{AC}$.

Example 1 **In ΔFGH, $\overline{FH} \cong \overline{GH}$. Name two congruent angles.**



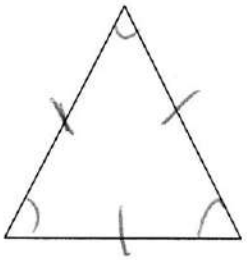
Isosceles Δ
∠F ≅ ∠G
HG = 6 FH = 6

A couple of corollaries:

COROLLARY TO THE BASE ANGLES THEOREM
If a triangle is equilateral, then it is equiangular.

COROLLARY TO THE CONVERSE OF BASE ANGLES THEOREM

If a triangle is equiangular, then it is equilateral



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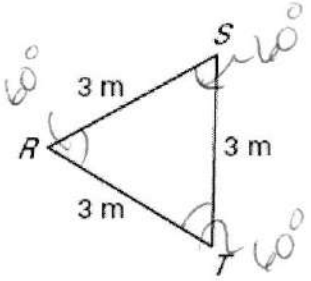
Example 2 **Find the measures of $\angle R$, $\angle S$, and $\angle T$.**

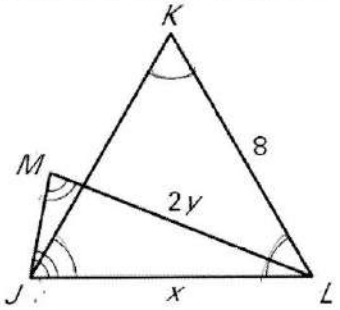


$m\angle R + m\angle S + m\angle T = 180°$

$3(m\angle R) = 180°$

$m\angle R = 60°$

Example 3 **Find the values of x and y in the diagram.**



ΔJKL - equilateral

ΔJLM - isosceles

$X = 8$

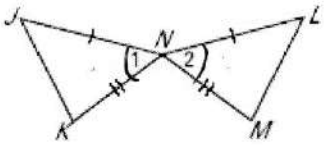
$X = 2y$

$8 = 2y \quad y = 4$

Two column proof: **Write a proof.**

Given $\overline{JN} \cong \overline{LN}$, $\overline{KN} \cong \overline{MN}$

Prove $\Delta JKN \cong \Delta LMN$



SAS

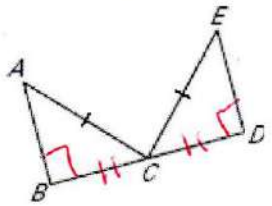
$\angle 1 + \angle 2$ Vertical

Statements	Reasons
1) $\overline{JN} \cong \overline{LN}$, $\overline{KN} \cong \overline{MN}$	1) Given
2) $\angle 1 \cong \angle 2$	2) Vertical $\angle$s Congruence theorem
3) $\Delta JKN \cong \Delta LMN$	3) SAS Congruence postulate

Two Column Proof:

Given $\overline{AC} \cong \overline{EC}$, $\overline{AB} \perp \overline{BD}$, $\overline{ED} \perp \overline{BD}$, $\overline{AC}$ is a bisector of $\overline{BD}$.

Prove $\Delta ABC \cong \Delta EDC$



Statements	Reasons
1. $\overline{AC} \cong \overline{EC}$	1. Given
2. $\overline{AB} \perp \overline{BD}$, $\overline{ED} \perp \overline{BD}$	2. Given
3. $\angle B$ and $\angle D$ are right angle.	3. Definition of $\perp$ lines
4. ΔABC and ΔEDC are right Δ's.	4. Definition of a right Δ
5. $\overline{AC}$ is a bisector of $\overline{BD}$.	5. Given
6. $\overline{BC} \cong \overline{DC}$	6. Definition of segment bisector
7. $\Delta ABC \cong \Delta EDC$	7. HL Congruence Theorem

CW/HW

p. 238; 24 & 26
pp. 243-245 12-15, 25-27, 34-36
pp. 253-255; 8-13 all, 31
pp. 259; 3-8 all, 14
pp. 267; 3-17 odd