GSE Geometry Unit 2 – Congruence and Proofs Notes

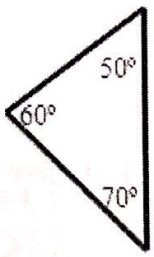
Name _____ Date _____

Day 2 – Triangles and Triangle Inequalities

Triangles can be classified by two categories: **by Angles and by Sides.**

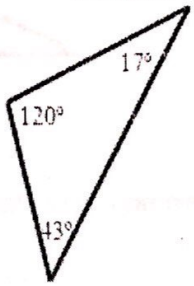
ANGLES

Acute



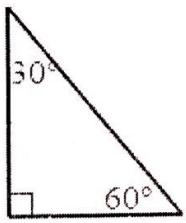
All Acute Angles

Obtuse



One Obtuse Angle

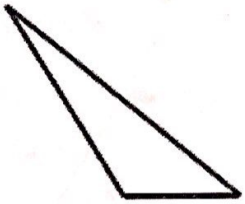
Right



One Right Angle

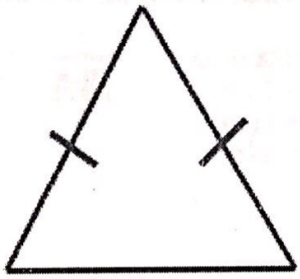
SIDES

Scalene



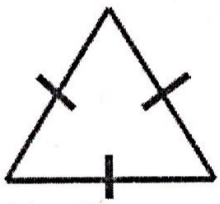
No Sides Congruent

Isosceles



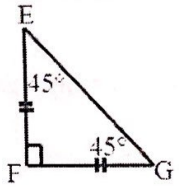
At Least 2 Sides Congruent

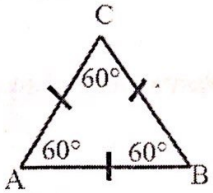
Equilateral



All Sides Congruent

Practice: Classify the triangles by sides and angles. **Think About It:** Check which triangles are possible.





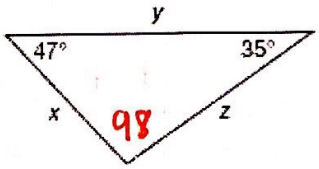
	Acute	Obtuse	Right
Scalene			
Isosceles	✓ACB		✓EFG
Equilateral	✓AGB		

Side Inequality Theorem

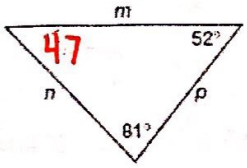
Side Inequality Theorem: If one side of a triangle is longer than the other side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

This means: The largest angle of a triangle lies opposite the longest side. The smallest angle lies opposite the shortest side. If two angles are equal, their side lengths will be equal.

Example: List the sides from shortest to longest for each diagram.



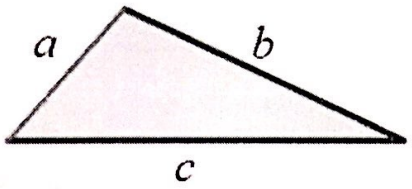
X, Z, Y



P, N, M

Triangle Inequality Theorem

Triangle Inequality Theorem: The sum of the lengths of any two sides of a triangle is greater than the length of the third side.



$a + b > c$
$a + c > b$
$b + c > a$

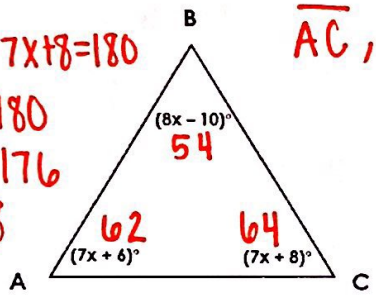
Example: Determine if it is possible to draw a triangle with side measures 12, 11, and 17.

$12+11>17$
$11+17>12$
$12+17>11$

Practice:

For the triangle, list the sides in order from shortest to longest measure.

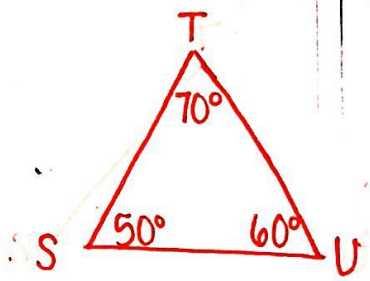
a.



$8x-10+7x+6+7x+8=180$
$22x+4=180$
$22x=176$
$x=8$

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

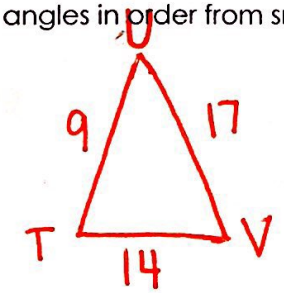
b. In ΔSTU
m∠S = 50°
m∠T = 70°
m∠U = 60°



$\overline{TU}, \overline{ST}, \overline{SU}$

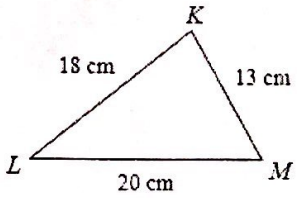
For the triangle, list the angles in order from smallest to largest measure.

a. In ΔTUV
UV = 17
TV = 14
TU = 9



$\angle V, \angle U, \angle T$

b.



$\angle L, \angle M, \angle K$

Determine if it is possible to draw a triangle with the following side measures:

a. 7, 11, 18

$7+11 \not> 18$

NO

b. 9, 14, 22

$9+14>22$
$9+22>14$
$14+22>9$

YES