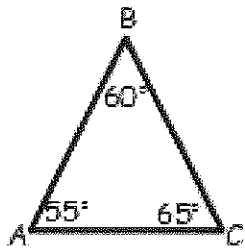


The **longest side** of a triangle is opposite its _____ angle.

The **shortest side** of a triangle is opposite its _____ angle.

The **largest angle** is opposite the _____ side.

The **smallest angle** is opposite the _____ side.



Longest side _____

Smallest Angle _____

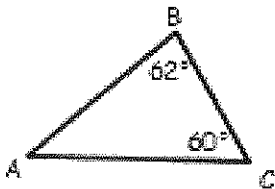
Shortest Side _____

Smallest Angle _____

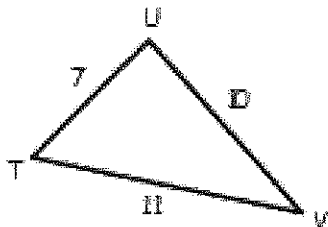
Theorem: If one side of a triangle is longer than another side, then the angle opposite the _____
_____ is larger than the angle opposite the _____.

Theorem: If one angle of a triangle is larger than another angle, then the side opposite the _____
_____ is longer than the side opposite the _____.

Example #1: Write the sides of the triangle in order from shortest to longest.



Example #2: Write the angles in order from smallest to largest.



6.4 Inequalities in Two Triangles

- The Hinge Theorem (SAS Inequality Theorem)
 - If two sides of one triangle are congruent to two sides of another triangle, and the included angles are not congruent, then the longer third side is opposite the larger included angle.

If ... $m\angle A > m\angle X$

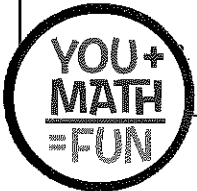
Then ... $BC > YZ$

Using the Converse of the Hinge Theorem

- What is the range of the possible values for x ?

Using the Hinge Theorem

- Which of the following statements must be true?
 - $AS < YU$
 - $SK > YU$
 - $SK < YU$
 - $AK = YU$



Using the Converse of the Hinge Theorem

- Step 1 – Find an upper limit for the value of x .

$$RS > TS$$

$$m\angle RUS > m\angle TUS$$

$$60 > 5x - 20$$

$$80 > 5x$$

$$16 > x$$
- Step 2 – Find a lower limit for the value of x .

$$m\angle TUS > 0$$

$$5x - 20 > 0$$

$$5x > 20$$

$$x > 4$$

So, $4 < x < 16$.

Converse of the Hinge Theorem (SSS Inequality)

- If two sides of one triangle are congruent to two sides of another triangle, and the third sides are not congruent, then the larger included angle is opposite the longer third side.

If ... $BC > YZ$

Then ... $m\angle A > m\angle X$

List the sides in order from shortest to longest.

