Activity and Notes for Lesson 6-4: Inequalities for One Triangle

Step 1: make sure you have the following sized pieces of linguini in your bag

2cm, 2cm, 3cm, 4cm, 5cm, and 7cm

Step 2: Make a triangle by joining the following pieces endpoint to endpoint

2cm, 3cm, and 4cm

Step 3: change the 2cm side to a 5cm side

5, 3, 4

What changes did you notice in the triangle?

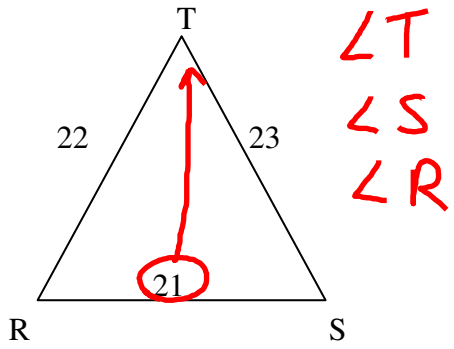
obtuse → right
Δ got larger

Rules for sides and angles in a triangle:
* The longest side is across the triangle from the largest angle
* The shortest side is across the triangle from the smallest angle
* The medium sized side is across from the medium sized angle

- If two sides are congruent then the angles across from them are congruent

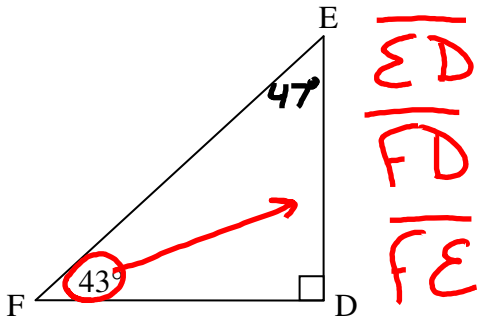
Example:

a) name the angles in order from smallest to largest



∠T
∠S
∠R

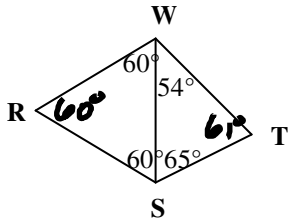
b) name the sides in order from smallest to largest



$\overline{ED}$
$\overline{FD}$
$\overline{FE}$

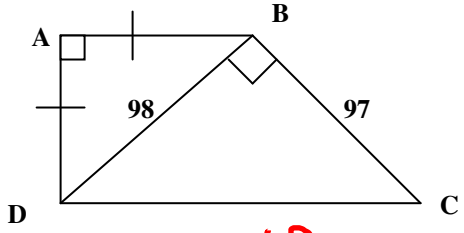
Example: Which segment (in a) or angle (in b) shown in each picture would be the longest of the entire diagram.

a)



$\overline{WT}$

b)



∠A + ∠B

Use your linguini to fill in the following table:

Pieces to use a	b	c	Can they make a triangle?	a + b ___ c	b + c ___ a	a + c ___ b
2cm	2cm	4cm	no	2+2 = 4	2+4 > 2	2+4 > 2
2cm	3cm	7cm	no	2+3 < 7	3+7 > 2	2+7 > 3
3cm	4cm	5cm	yes	3+4 > 5	4+5 > 3	3+5 > 4
4cm	5cm	7cm	yes	4+5 > 7	5+7 > 4	4+7 > 5

What do you notice about the sides that did make a triangle?

all >

Theorem 6-4: The Triangle Inequality Theorem
The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Example: decide whether it is possible for a triangle to have sides with the lengths indicated.

a) 10, 9, 8

$9+8>10$

yes

b) 6, 6, 20

$6+6<20$

no

c) 16, 11, 5

$11+5=16$

no

Example: the lengths of two sides of a triangle are given. Write the numbers that best complete the statement: The length of the third side must be greater than _____ but less than _____.

a) 6, 9

6, 9, ____

$3<x<15$

b) 7n, 10n

$3n<x<17n$