5.5 Warm-Up:

Match the point of concurrency to the concurrent segments.

1. midsegment E
2. perpendicular bisectors B
3. angle bisectors D
4. medians A
5. altitudes C

A. ~~A.~~ centroid
B. ~~B.~~ circumcenter
C. ~~C.~~ orthocenter
D. ~~D.~~ incenter
E. ~~E.~~ no point of concurrency

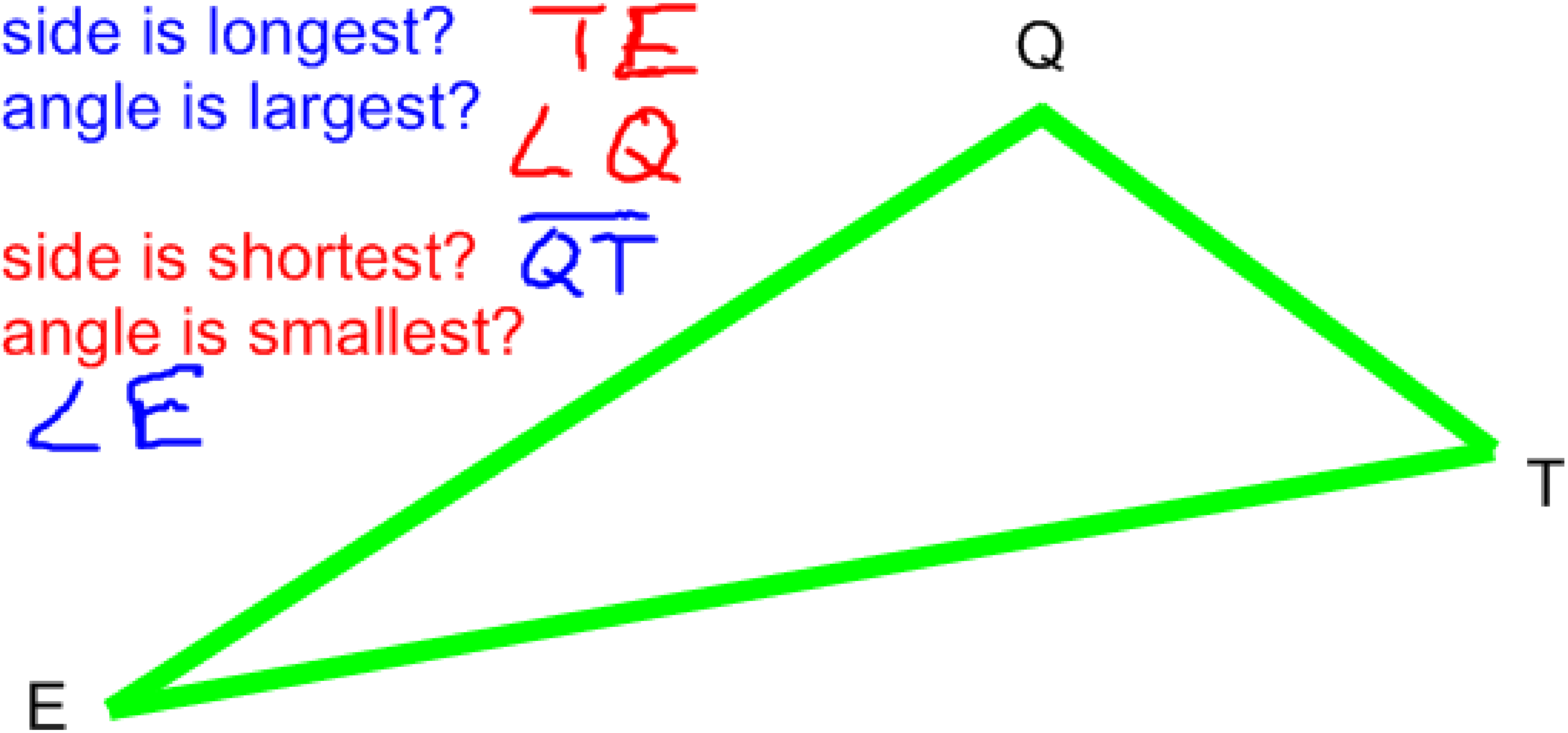
What side is longest? $\overline{TE}$

What angle is largest? $\angle Q$

What side is shortest? $\overline{QT}$

What angle is smallest?

$\angle E$



What do you notice?

largest is opposite longest

smallest " " shortest

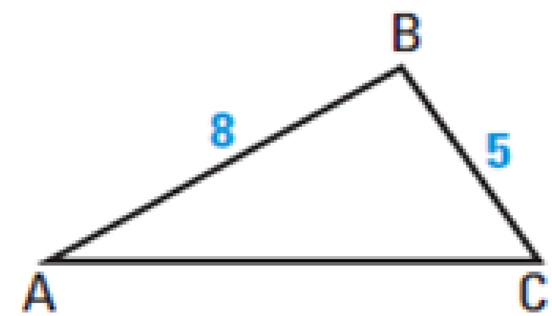
True for ALL triangles?

This can help you decide if certain arrangements of side lengths and angle measures will work for a triangle.

Theorem 5.10

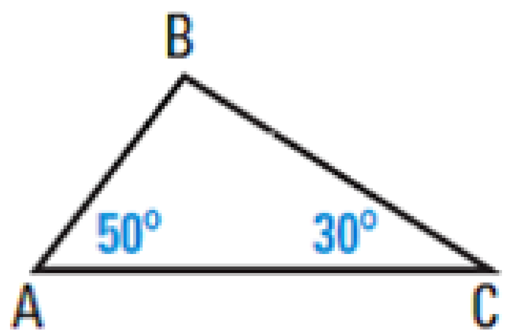
If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.

If $AB > BC$,
then $m\angle C > m\angle A$.



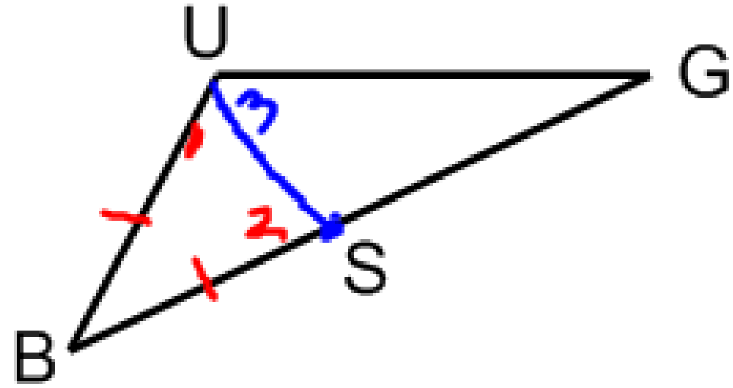
Theorem 5.11

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



If $m\angle A > m\angle C$,
then $BC > AB$.

Prove Theorem 5.10:



Given: $BG > BU$

Prove: $m\angle BUG > m\angle G$

We know $BG > BU$. Place Pt S on $\triangle$ so that $BU = SB$. So $\angle 1 \cong \angle 2$ by Base $\angle$'s Thm.

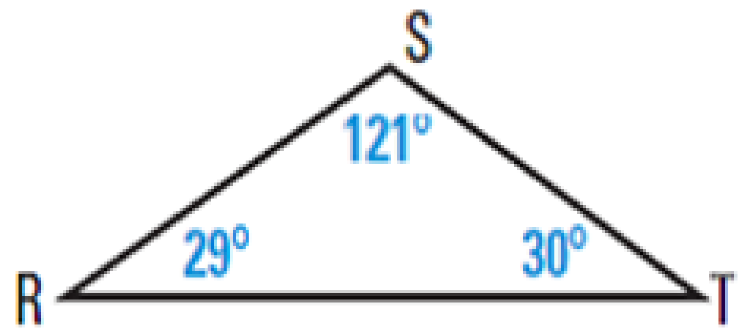
Also, $m\angle BUG =$ $m\angle 1 + m\angle 3$ by $\angle$ + Post (whole = sum parts)

$m\angle 2 = m\angle 3 + m\angle G$ by Ext. $\angle$ Thm. &

$m\angle BUG > m\angle 1$ & $m\angle 2 > m\angle G$

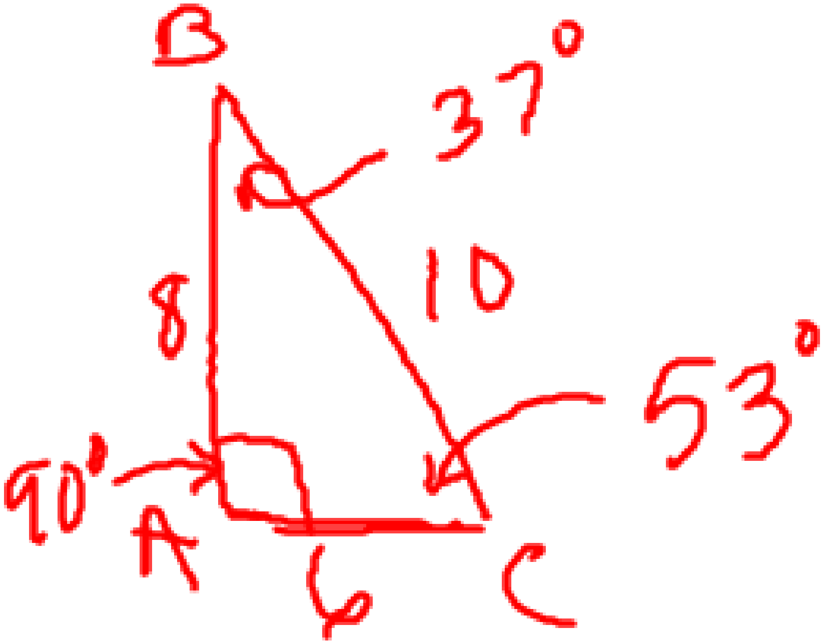
Since $\angle 1 \cong \angle 2$ then $m\angle BUG > m\angle G$.

1. List the sides of $\triangle RST$ in order from shortest to longest.



$\overline{ST}, \overline{RS}, \overline{RT}$

2. A right triangle has sides that are 6, 8, and 10 feet long and angles of 90, about 37, and about 53. Sketch and label the triangle with the shortest side on the bottom and the right angle at the left.



1. Can we form a triangle using side lengths 3, 4, and 5?

yes, $3+4>5$

2. Can we form a triangle using side lengths 1, 2, and 5?

NO, $1+2<5$

$\ngtr$

3. Can we form a triangle using side lengths 3, 2, and 5?

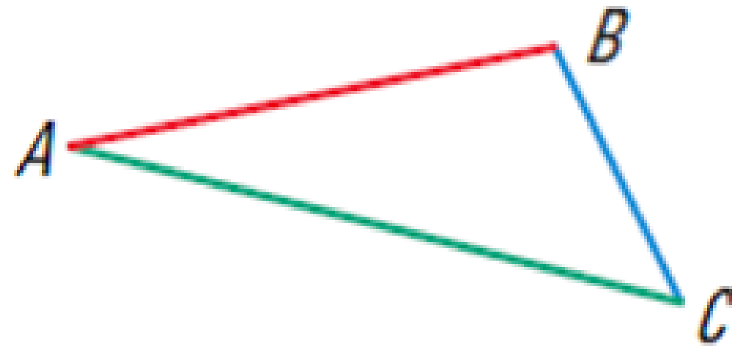
NO, $3+2=5$

$\ngtr$

Triangle Inequality Thm

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

The sum of the smallest 2 sides must be great. than the longest.



$AB + BC > AC$

$AB + AC > BC$

$BC + AC > AB.$

A triangle has one side length 12 and another of length 8. Describe the possible lengths of the third side.

$8 + x > 12$ $\quad\quad$ $12 + 8 > x$

$x > 4$ and $20 > x$

Homework:

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If you feel you do not yet fully understand this lesson, then do the following:
#'s 1, 2, 6-28 E,
37, 39, 52, 54

OR If you feel you already know this material, do these:
#'s 10, 14, 18, 26, 28, 39

Your work must be neat & correct. If it is not, you need more practice and must do the remainder of the assignment.