

Honors Geometry  
Section 5.7 Notes  
Inequalities in Two Triangles

Name: Key

Key Definitions:

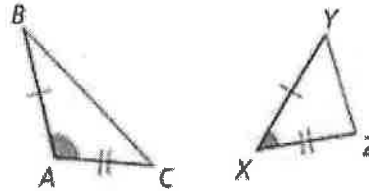
The Hinge Theorem:

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 ...

$$BC > YZ$$

\*\*The converse is also true!

Practice Problems

Write an inequality relating the given side lengths. If there is not enough information to reach a conclusion, write *no conclusion*.

1.   
  $ST$  and  $MN$        $ST > MN$

2.   
  $BA$  and  $BC$        $BA > BC$

3.   
  $CD$  and  $CF$        $CD < CF$

4.   
  $JL$  and  $MO$        $JL > MO$

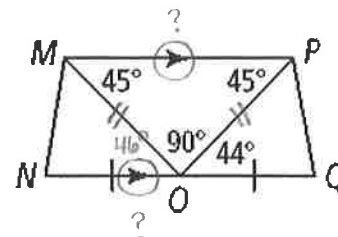
Copy and complete with  $>$  or  $<$ . Explain your reasoning.

5.  $m\angle POQ$   $\frac{?}{?}$   $m\angle MON$   
 $<$

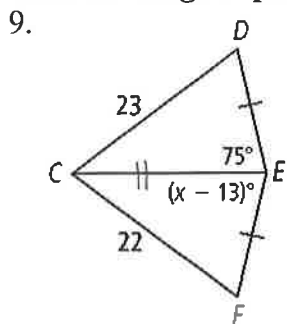
6.  $MN$   $\frac{?}{?}$   $PQ$   
 $>$

7.  $MP$   $\frac{?}{?}$   $OP$   
 $>$

8.  $\angle N$   $\frac{?}{?}$   $\angle Q$   
 $=$



Find the range of possible values for each variable.



$$75 > x - 13$$

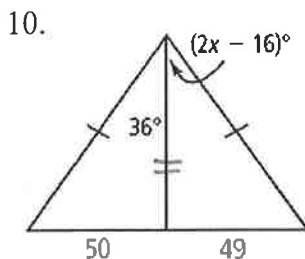
$$+13 \quad +13$$

$$\boxed{88 > x}$$

$$x - 13 > 0$$

$$+13 \quad +13$$

$$\boxed{x > 13}$$



$$2x - 16 < 36$$

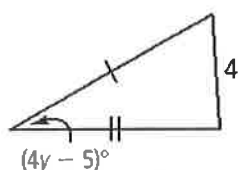
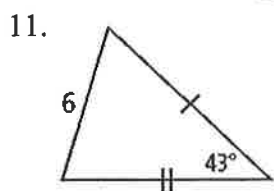
$$2x < 52$$

$$\boxed{x < 26}$$

$$2x - 16 > 0$$

$$2x > 16$$

$$\boxed{x > 8}$$



$$4y - 5 < 43$$

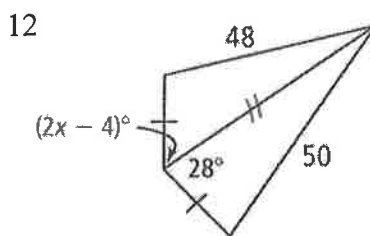
$$4y < 48$$

$$\boxed{y < 12}$$

$$4y - 5 > 0$$

$$4y > 5$$

$$\boxed{y > \frac{5}{4}}$$



$$2x - 4 < 28$$

$$2x < 32$$

$$\boxed{x < 16}$$

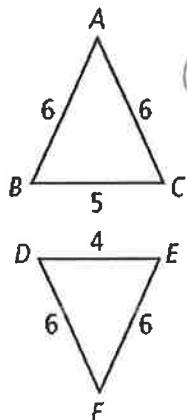
$$2x - 4 > 0$$

$$2x > 4$$

$$\boxed{x > 2}$$

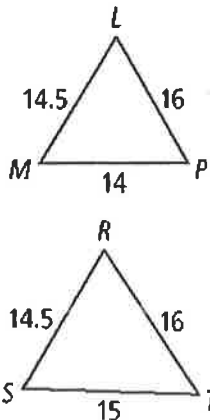
Write an inequality relating the given angle measures. If there is not enough information to reach a conclusion, write *no conclusion*.

13.  $m\angle A$  and  $m\angle F$



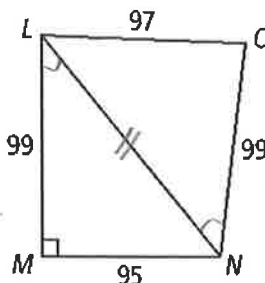
$$\boxed{m\angle A > m\angle F}$$

14.  $m\angle L$  and  $m\angle R$



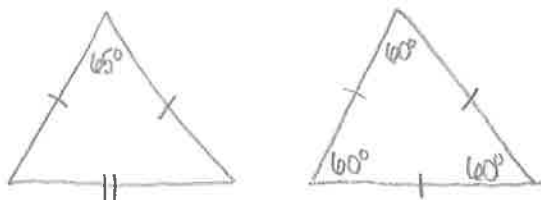
$$\boxed{m\angle L < m\angle R}$$

15.  $m\angle MLN$  and  $m\angle ONL$



$$\boxed{m\angle MLN < m\angle ONL}$$

16. The legs of an isosceles triangle with a  $65^\circ$  vertex angle are congruent with the sides of an equilateral triangle. Which triangle has a greater perimeter? How do you know?



The isosceles triangle  
b/c the vertex is bigger.