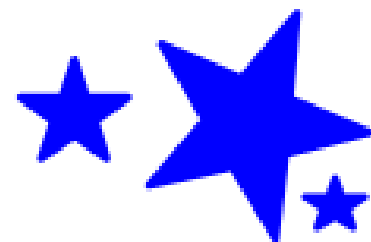


**5 - 2**

# **Inequalities and Triangles**

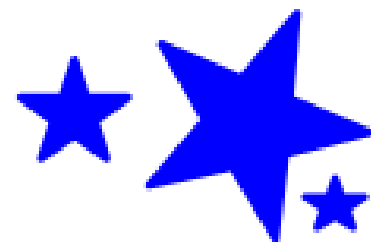
## Properties of Inequalities



**Comparison:**  $a < b$ ,  $a > b$ ,  $a = b$

**Transitive:** If  $a < b$  and  $b < c$ , then  $a < c$ .  
(also  $>$ )

## Properties of Inequalities



**Add/Subtract:** If  $a < b$ ,  $a + c < b + c$   
 $a - c < b - c$

**Multiply/Divide:** If  $a < b$ ...

**c is positive**  $ac < bc$  and  $\frac{a}{c} < \frac{b}{c}$

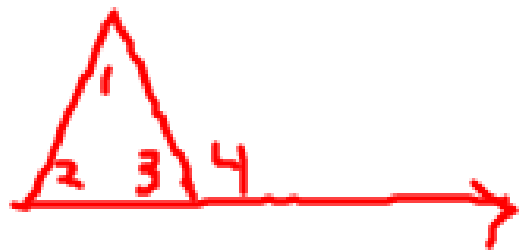
**c is negative**  $ac > bc$  and  $\frac{a}{c} > \frac{b}{c}$

## Theorem 5.8:

(Exterior Angle Inequality Theorem)



If an angle is an exterior angle of a triangle, then its measure is greater than the measure of either of its corresponding remote interior angles.

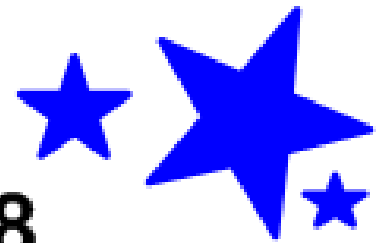


$$m\angle 4 = m\angle 1 + m\angle 2$$

$$\angle 4 > \angle 1$$

$$\angle 4 > \angle 2$$

Ex: List all of the angles whose measures are less than  $m\angle 8$ .



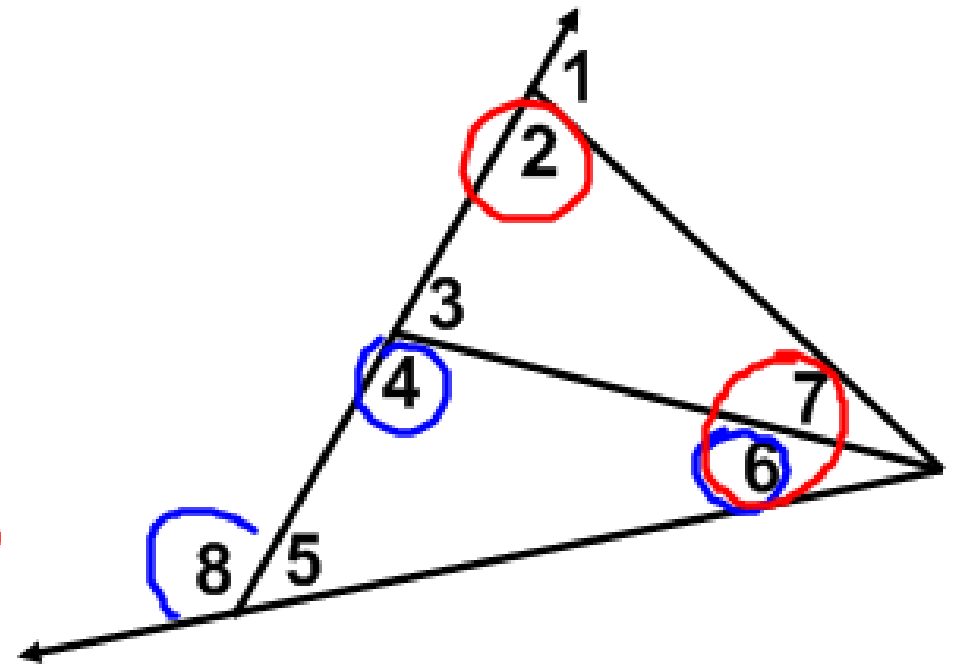
$$m\angle 8 > m\angle 4$$

$$m\angle 8 > m\angle 6$$

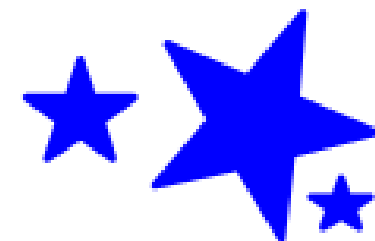
$$m\angle 8 > m\angle 2$$

$$m\angle 8 > m\angle 6 + m\angle 7$$

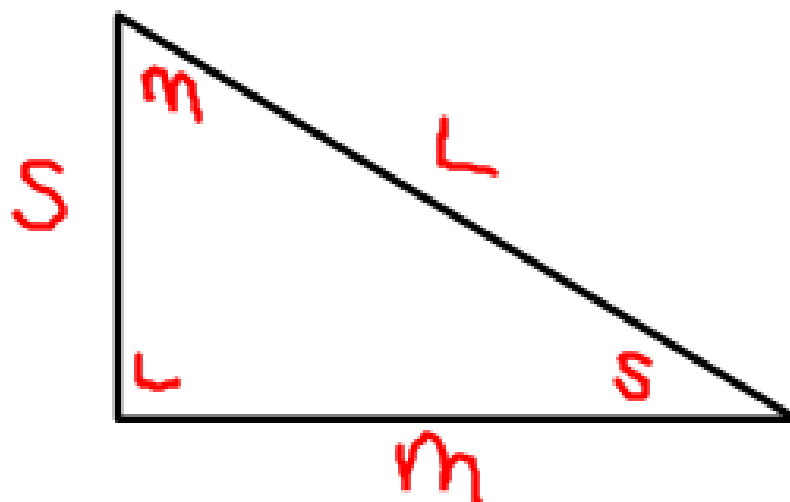
$$m\angle 8 > m\angle 7$$



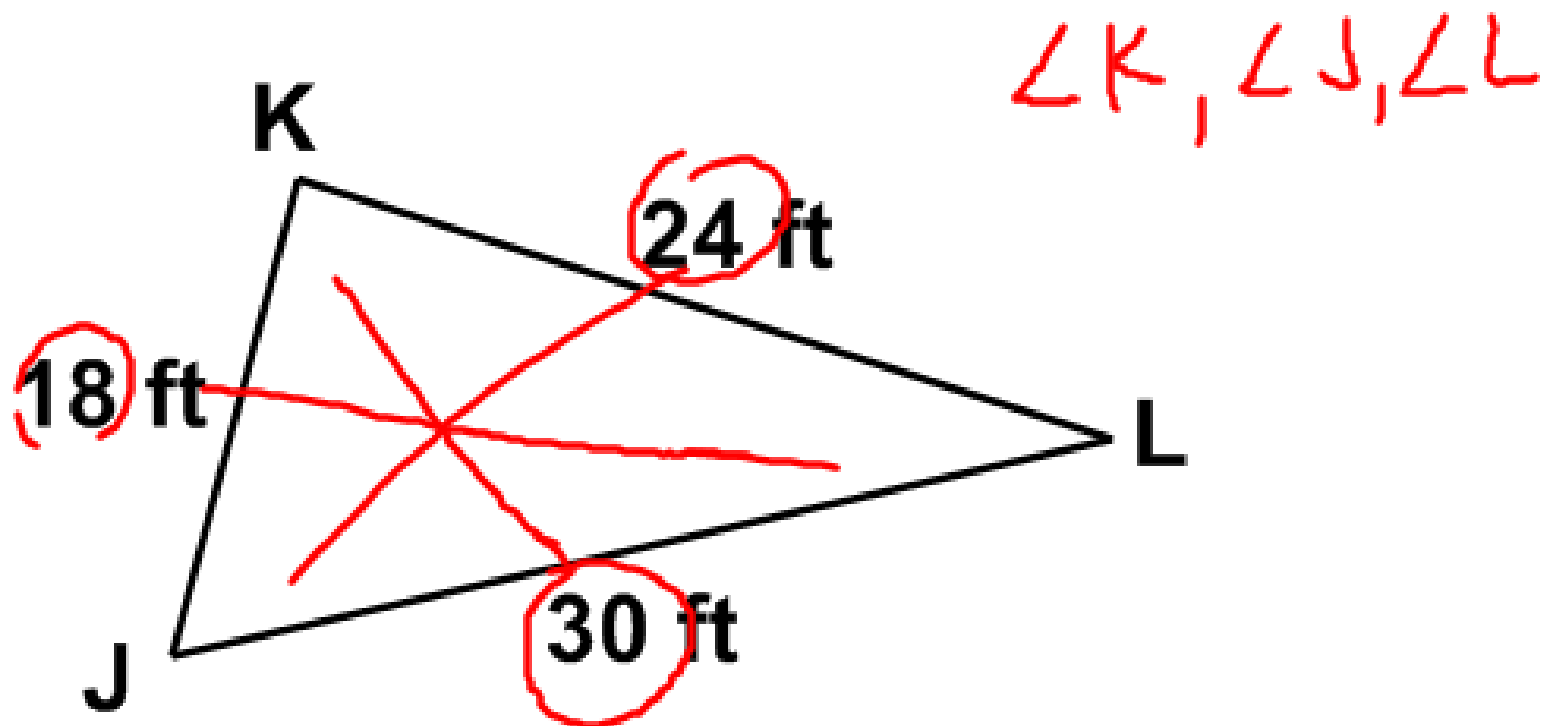
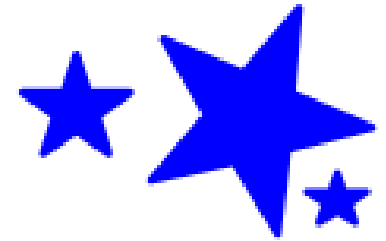
## Theorem 5.9:



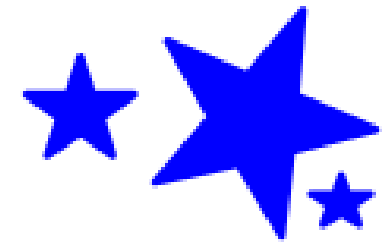
If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.



Ex: List the angles from the picture in order from largest to smallest.

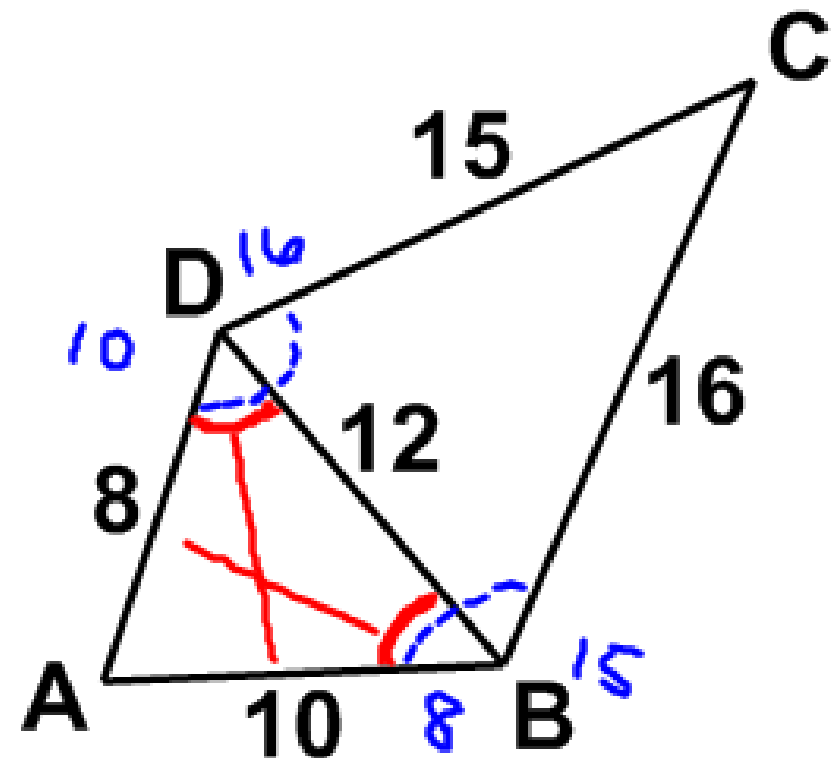


Ex: Determine the relationship between the given angles.



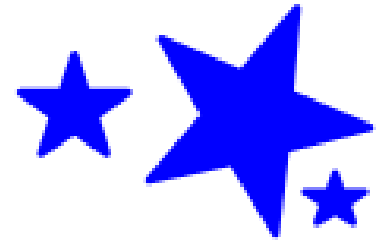
$$m\angle ADB \overset{(10)}{>} \overset{(8)}{m\angle DBA}$$

$$m\angle CDA \overset{(16)}{>} \overset{(12)}{m\angle CBA}$$

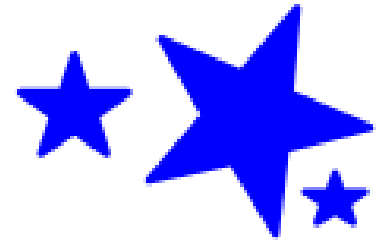




## Theorem 5.10:



**If one angle of a triangle has a greater measure than another angle, then the side opposite the greater angle is longer than the side opposite the lesser angle.**



Homework:

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