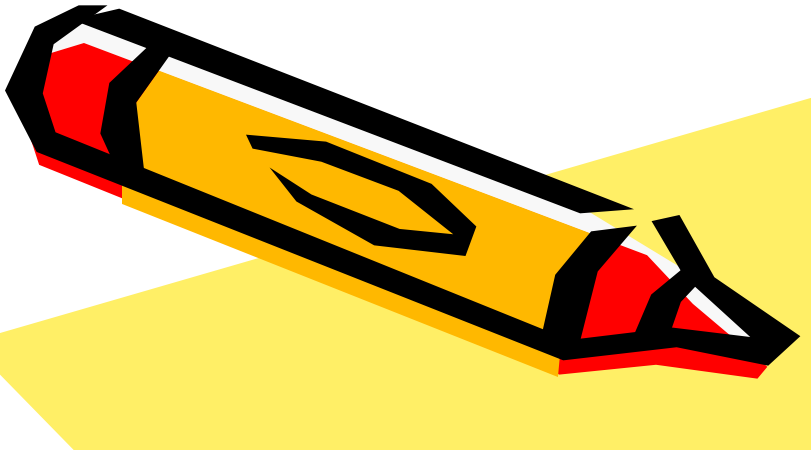


Geometry

Inequalities Involving Two Triangles

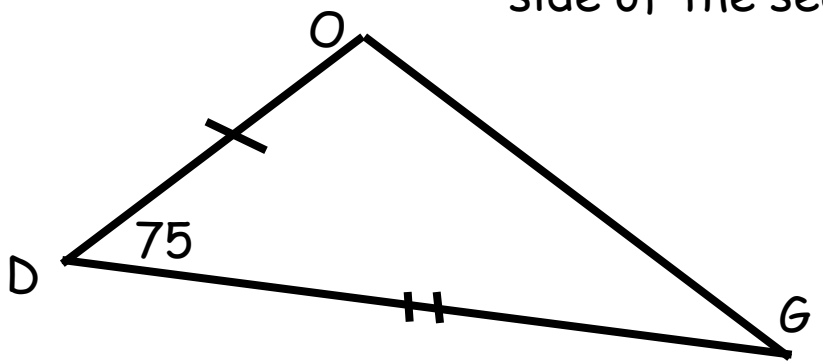
Inequalities Involving Two Triangles

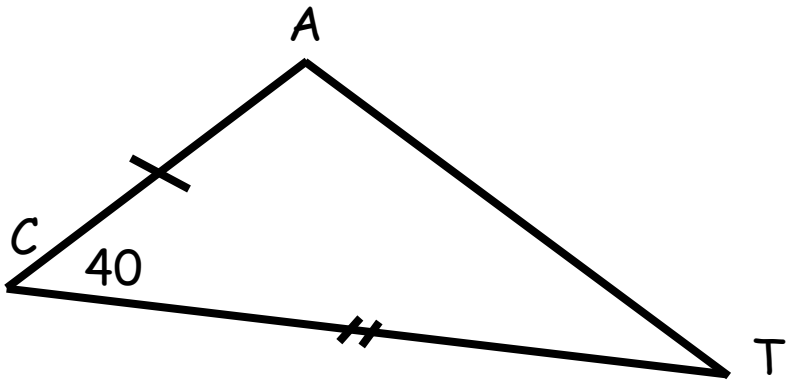
The goal here is to compare angles and sides of two non-congruent triangles.

By knowing some limited information, we can determine how specific sides or angles, in the two different triangles, compare to each other (meaning which is bigger or smaller).

SAS Inequality Theorem (Hinge theorem)

If two sides of one triangle are congruent to two sides of another triangle and the angle in between the two sides of one triangle has a greater measure than the angle between the two sides in the second triangle, then the third side of the first triangle is longer than the third side of the second triangle.



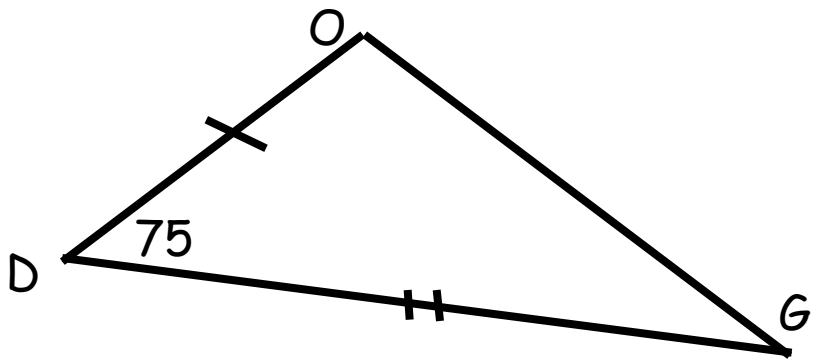


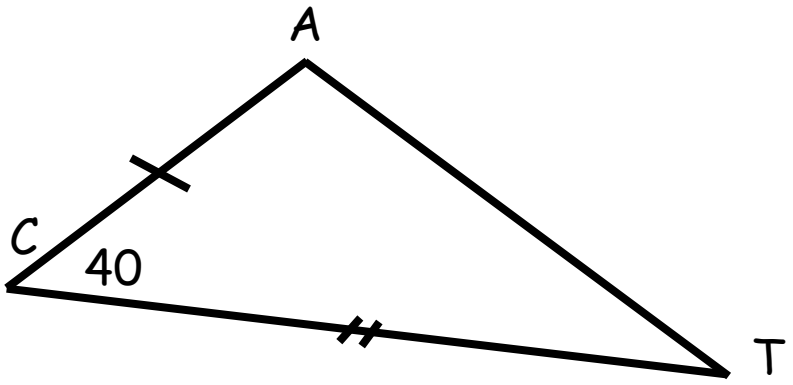
If $\overline{DO} \cong \overline{CA}$, $\overline{DG} \cong \overline{CT}$ and $m\angle D > m\angle C$

then $OG > AT$

SAS Inequality Theorem (Hinge theorem)

Think of the vertex as a hinge. The more you open the hinge, the longer you stretch the third side. We need the two sides of the hinge to be congruent to provide a comparison between the two triangles.



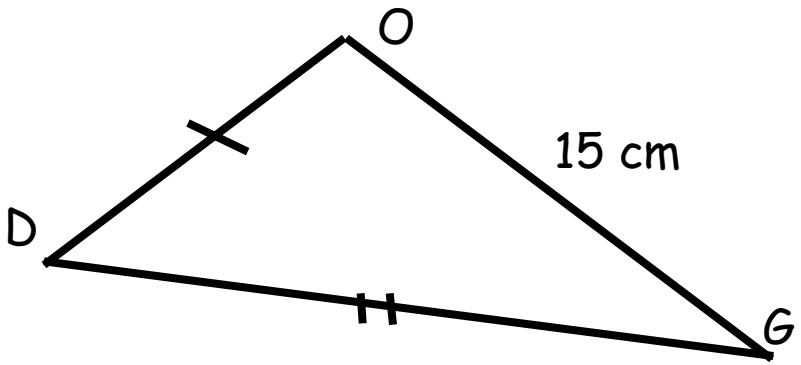


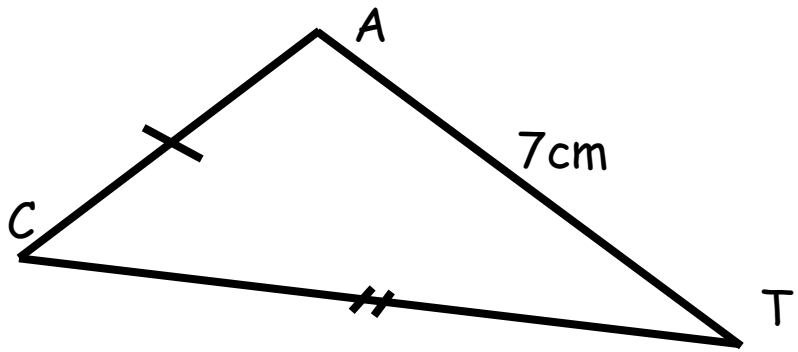
If $\overline{DO} \cong \overline{CA}$, $\overline{DG} \cong \overline{CT}$ and $m\angle D > m\angle C$

then $OG > AT$

SSS Inequality Theorem

If two sides of one triangle are congruent to two sides of another triangle and the third side in one triangle is longer than the third side in the other, then the angle between the pair of congruent sides in the first triangle is greater than the corresponding angle in the second triangle.





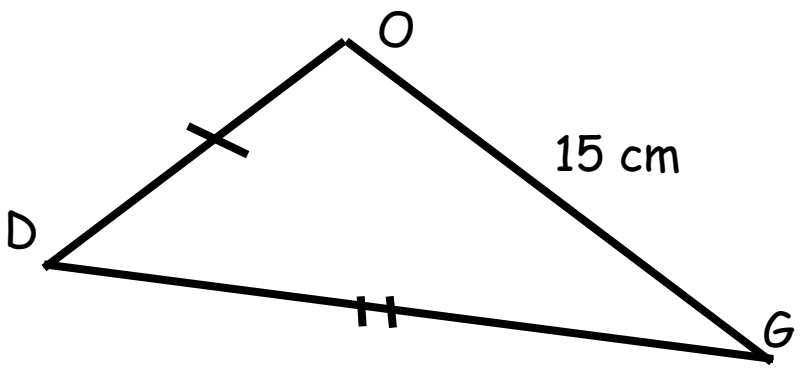
If $\overline{DO} \cong \overline{CA}$, $\overline{DG} \cong \overline{CT}$

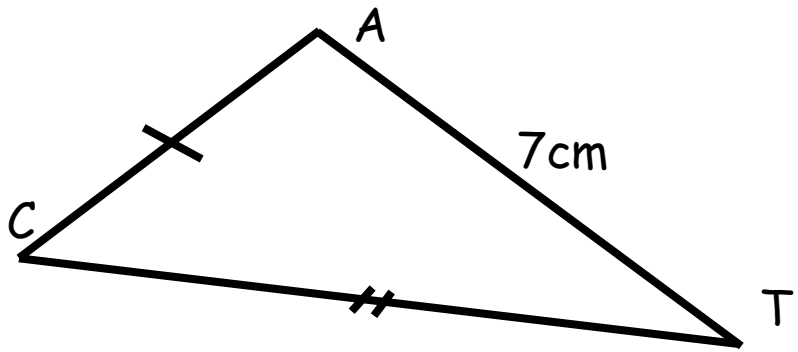
and $OG > AT$

then $m\angle D > m\angle C$

SSS Inequality Theorem

This is basically the reverse of the SAS Inequality Theorem, but uses the same hinge idea. If the side is stretched longer, then the angle must have been opened bigger. Again, we need the two sides of the hinge to be congruent to provide a comparison between the two triangles.





If $\overline{DO} \cong \overline{CA}$, $\overline{DG} \cong \overline{CT}$

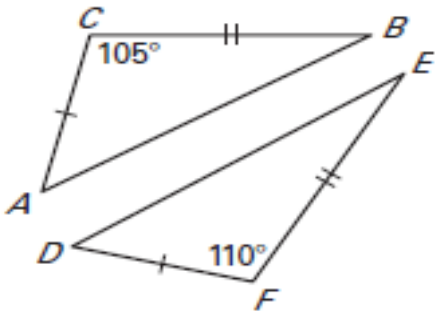
and $OG > AT$

then $m\angle D > m\angle C$

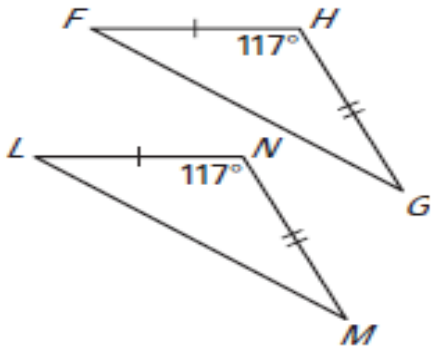
Inequalities Involving Two Triangles

Complete with <, >, or = .

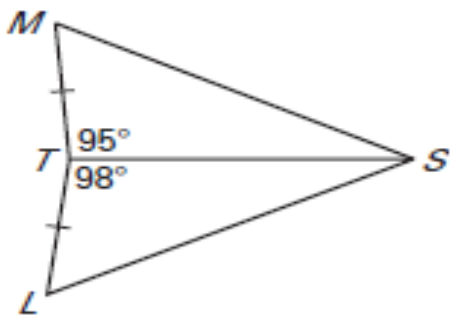
a) AB ? DE



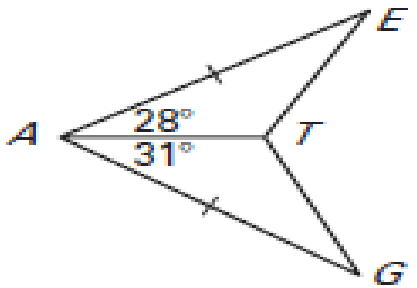
b) FG ? LM



c) MS ? LS



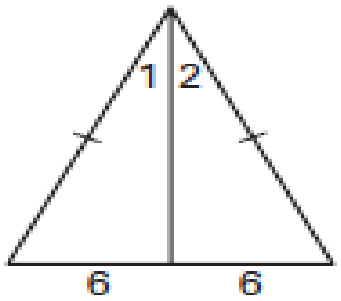
d) ET ? GT



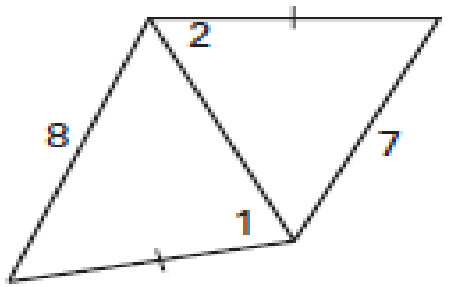
Inequalities Involving Two Triangles

Complete with <, >, or = .

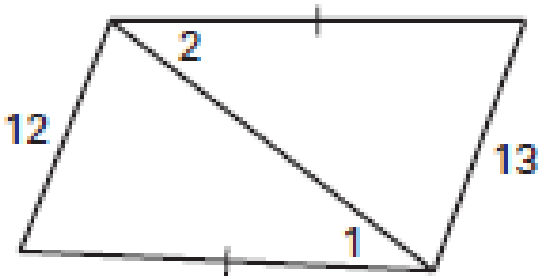
a) $m\angle 1 \_\_?\_\_ m\angle 2$



b) $m\angle 1 \_\_?\_\_ m\angle 2$



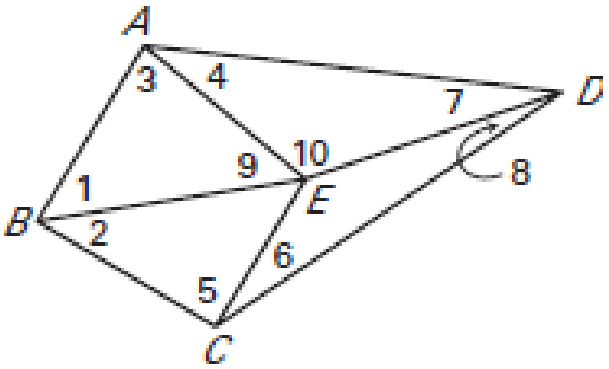
c) $m\angle 1 \_\_?\_\_ m\angle 2$



Inequalities Involving Two Triangles

Match the conclusion on the right with the given information.
Explain **your reasoning.**

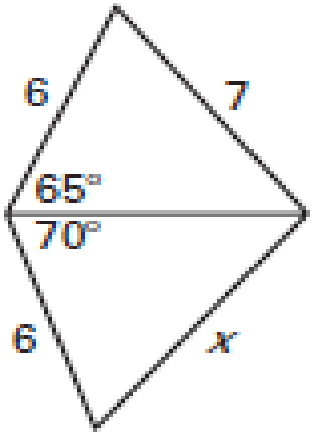
1.	$AB = BC, m\angle 1 > m\angle 2$	**A.**	$m\angle 7 > m\angle 8$
2.	$AE > EC, AD = CD$	**B.**	$AD > AB$
3.	$m\angle 9 < m\angle 10, BE = ED$	**C.**	$m\angle 3 + m\angle 4 = m\angle 5 + m\angle 6$
4.	$AB = BC, AD = CD$	**D.**	$AE > EC$



Inequalities Involving Two Triangles

Write an inequality to describe the possible values of x.

a)



b)