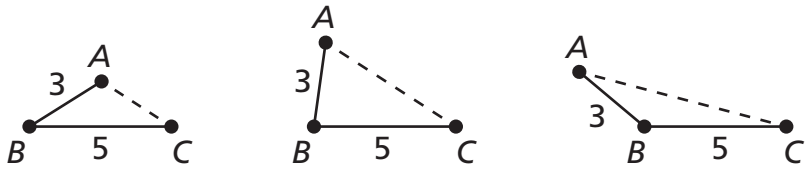
6.6 Start Thinking

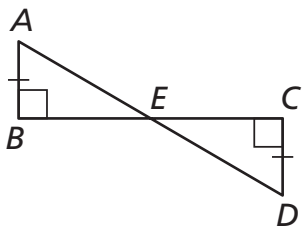
Consider two line segments $\overline{AB}$ and $\overline{BC}$ hinged at point B so that $\angle ABC$ can change in size as shown in the diagram. What happens to the length of $\overline{AC}$ as the angle increases in size? How large can the angle be and still form a triangle? What value is the length of $\overline{AC}$ approaching as the angle increases in size?



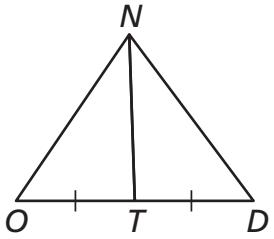
6.6 Warm Up

Determine if you can prove the two triangles are congruent. If they are congruent, explain your reasoning.

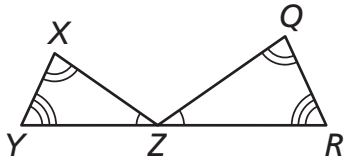
1. $\triangle ABE$ and $\triangle DCE$



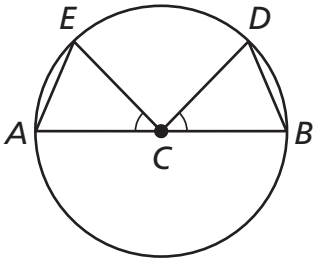
2. $\triangle NOT$ and $\triangle NDT$



3. $\triangle XYZ$ and $\triangle QRZ$



4. $\triangle CDB$ and $\triangle CEA$



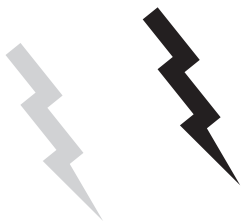
6.6 Cumulative Review Warm Up

Tell whether the black figure is a translation, reflection, rotation, or dilation of the gray figure.

1.

2.

3.

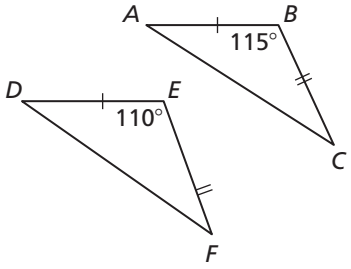


Name _____ Date _____

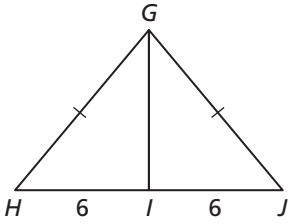
6.6 Practice A

In Exercises 1–4, copy and complete the statement with <, >, or =. Explain your reasoning.

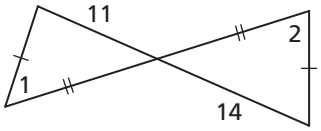
1. AC _____ DF



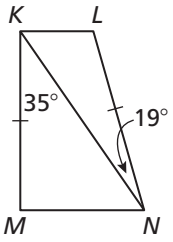
2. $m\angle HGI$ _____ $m\angle IGJ$



3. $m\angle 1$ _____ $m\angle 2$

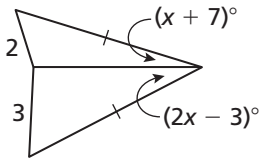


4. KL _____ MN

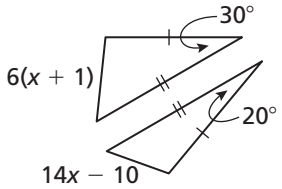


In Exercises 5 and 6, write and solve an inequality for the possible values of x.

5.



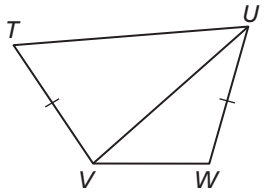
6.



In Exercises 7 and 8, write a proof.

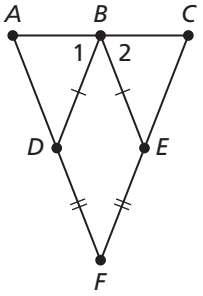
7. Given: $\overline{TV} \cong \overline{UW}$, $TU > VW$

Prove: $m\angle TVU > m\angle WUV$

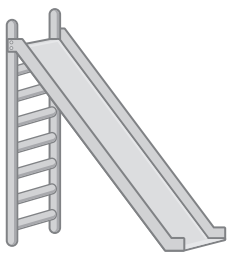


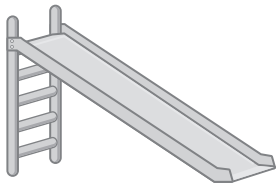
8. Given: $m\angle 1 > m\angle 2$, B is the midpoint of AC.

Prove: $AF > CF$



9. The figure shows two sliding boards. The slide is the same length in each case, but one is steeper than the other. Can you apply the Hinge Theorem (Theorem 6.12) or the Converse of the Hinge Theorem (Theorem 6.13) in this problem? Explain your reasoning.



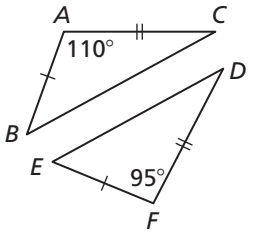


Name_____ Date _____

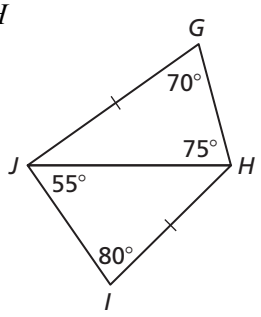
6.6 Practice B

In Exercises 1–4, copy and complete the statement with <, >, or =. Explain your reasoning.

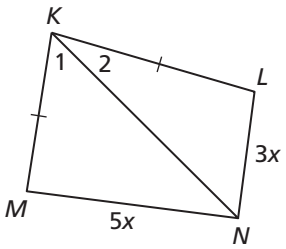
1. BC _____ DE



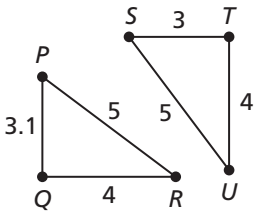
2. JI _____ GH



3. $m\angle 1$ _____ $m\angle 2$

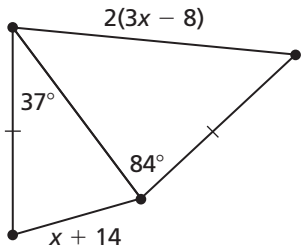


4. $m\angle U$ _____ $m\angle R$

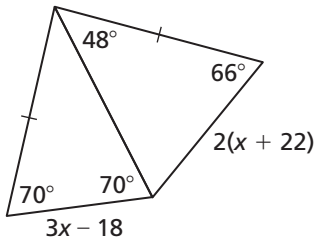


In Exercises 5 and 6, write and solve an inequality for the possible values of x.

5.



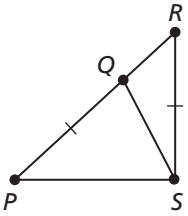
6.



7. Use the figure to write a proof.

Given: $\overline{PQ} \cong \overline{SR}$

Prove: $m\angle PQS > m\angle RSQ$



8. Two sailboats started at the same location. Sailboat A traveled 5 miles west, then turned $29°$ toward the north and continued for 8 miles. Sailboat B first went south for 8 miles, then turned $51°$ toward the east and continued for 5 miles. Which sailboat was farther from the starting point? Explain your reasoning.

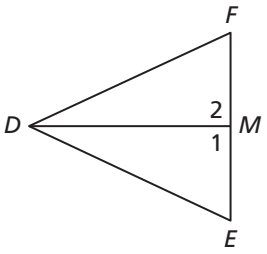
9. How are the Hinge Theorem (Theorem 6.12) and the SAS Congruence Theorem (Theorem 5.5) similar? How are they different? Explain your reasoning.

Name _____ Date _____

6.6 Enrichment and Extension

Inequalities in Two Triangles

1. In $\triangle DEF$, $\overline{DM}$ is a median. Determine if each statement is *always, sometimes,* or *never* true.



a. If $m\angle 2 > m\angle 1$, then $ED > FD$.

b. If $m\angle E > m\angle F$, then $\angle 1$ is obtuse.

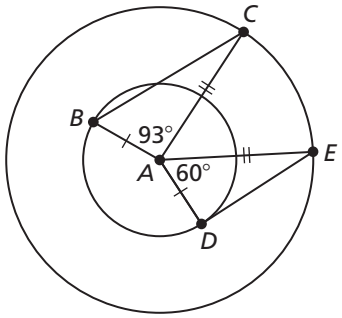
c. If $\angle 2$ is acute, then $m\angle F > m\angle E$.

d. If $m\angle E < m\angle F$, then $m\angle 1 < m\angle 2$.

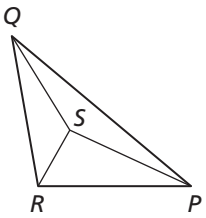
e. If $m\angle 2 > m\angle 1$, then $ED > FD$.

f. If $m\angle D = 90°$, then $FD > ED$.

2. *Concentric* circles are circles that have the same center and different radii. The circles in the figure are concentric. The measure of $\angle BAC$ is $93°$, and the measure of $\angle DAE$ is $60°$. Explain why BC must be greater than DE.



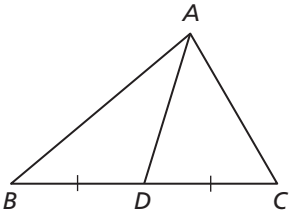
3. In $\triangle PQR$, $\angle SQR \cong \angle SRQ$, $PQ > PR$, $m\angle PSR = (4y + 9)°$, and $m\angle QSP = (6y - 24)°$. Find the range of values for y.



4. Write a two-column proof.

Given: D is the midpoint of $\overline{BC}$.
$m\angle ADB = 100°$

Prove: $m\angle C > m\angle A$



Name_____ Date _____

6.6 Puzzle Time

Which Animals Grow Down?

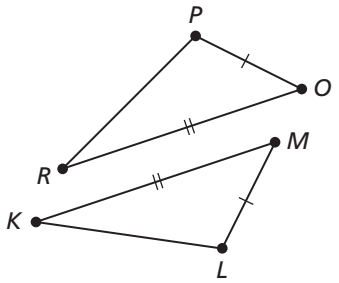
Circle the letter of each correct answer in the boxes below. The circled letters will spell out the answer to the riddle.

Complete the sentence.

1. If two sides of one triangle are congruent to two sides of another triangle, and the included angle of the first is larger than the included angle of the second, then the fact that the third side of the first is longer than the third side of the second demonstrates the _____ Theorem.

Complete with < or > using the diagram for △*POR* and △*LMK*.

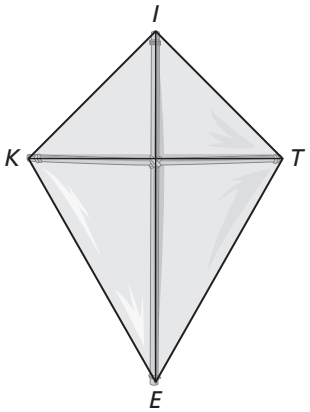
2. $\overline{PO} \cong \overline{LM}$, $\overline{OR} \cong \overline{MK}$, $KL = 20$, $RP = 14$, $m\angle M$ _____ $m\angle O$



Complete using the diagram.

3. If $IK = IT$ and $m\angle EIT > m\angle EIK$, which is longer, $\overline{KE}$ or $\overline{TE}$?

4. If $IT = IK$ and $TE < KE$, which is larger, $\angle TIE$ or $\angle KIE$?



D $>$	**F** $<$	**R** $\overline{KE}$	**U** hinge
O $\angle TIE$	**C** $\overline{TE}$	**G** ledge	**K** $\angle KIE$