Name _____

Class _____

Problem 1 – SAS Inequality Theorem

The SAS Inequality Theorem states:

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

1. Why do you think this theorem is called the "Hinge" theorem?

2. Based on your observations, does the SAS Inequality Theorem hold true for $\triangle ABC$ and $\triangle DEF$?

3. What happens to the lengths of $\overline{BC}$ and $\overline{EF}$ as $m\angle EDF$ approaches $m\angle BAC$?

4. If $m\angle EDF = m\angle BAC$, what property holds?

5. What happens to the lengths when $m\angle EDF$ is greater than $m\angle BAC$? How does this affect the statement of the theorem?

Problem 2 – SSS Inequality Theorem

The SSS Inequality Theorem states:

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

6. Based on your observations, does the SSS Inequality Theorem hold true for $\triangle ABC$ and $\triangle DEF$?

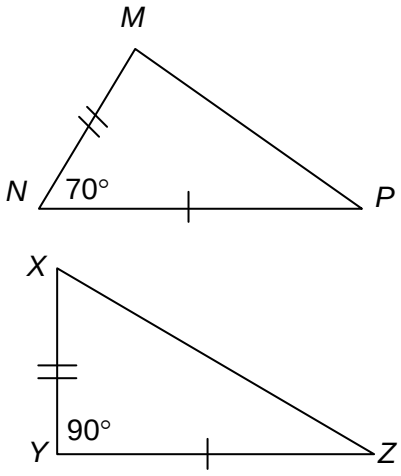
7. If $EF = BC$, what property holds true?

8. What happens to the angle measures when $\overline{EF}$ is longer than $\overline{BC}$?

9. Is there a similarity between the two theorems in this activity? Explain how triangle congruences can be derived from these theorems.

Exercises

10. Which side is longer, $\overline{MP}$ or $\overline{XZ}$?



11. Which angle is larger, $\angle XZY$ or $\angle MPN$?