NAME _____ DATE _____ PERIOD _____

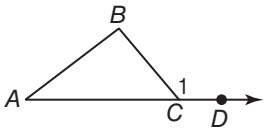
5-3 Study Guide and Intervention

Inequalities in One Triangle

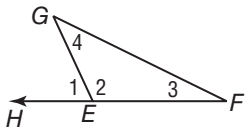
Angle Inequalities Properties of inequalities, including the Transitive, Addition, and Subtraction Properties of Inequality, can be used with measures of angles and segments. There is also a Comparison Property of Inequality.

For any real numbers a and b, either $a < b$, $a = b$, or $a > b$.

The Exterior Angle Inequality Theorem can be used to prove this inequality involving an exterior angle.

Exterior Angle Inequality Theorem	The measure of an exterior angle of a triangle is greater than the measure of either of its corresponding remote interior angles.	 $m\angle 1 > m\angle A$, $m\angle 1 > m\angle B$

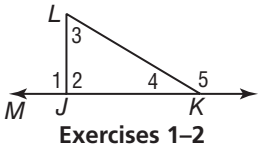
Example **List all angles of $\triangle EFG$ with measures that are less than $m\angle 1$.**



The measure of an exterior angle is greater than the measure of either remote interior angle. So $m\angle 3 < m\angle 1$ and $m\angle 4 < m\angle 1$.

Exercises

Use the Exterior Angle Inequality Theorem to list all of the angles that satisfy the stated condition.



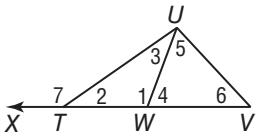
Exercises 1–2

1. measures are less than $m\angle 1$

2. measures are greater than $m\angle 3$

3. measures are less than $m\angle 1$

4. measures are greater than $m\angle 1$



Exercises 3–8

5. measures are less than $m\angle 7$

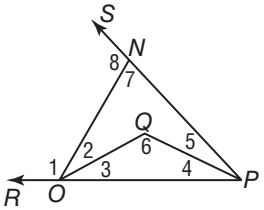
6. measures are greater than $m\angle 2$

7. measures are greater than $m\angle 5$

8. measures are less than $m\angle 4$

9. measures are less than $m\angle 1$

10. measures are greater than $m\angle 4$



Exercises 9–10

Lesson 5-3

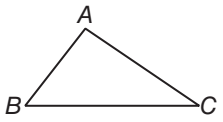
NAME _____ DATE _____ PERIOD _____

5-3 Study Guide and Intervention *(continued)*

Inequalities in One Triangle

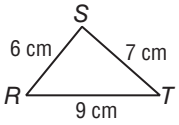
Angle-Side Relationships When the sides of triangles are not congruent, there is a relationship between the sides and angles of the triangles.

- 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.
- 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.



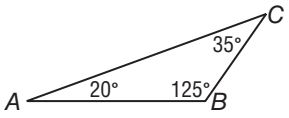
If $AC > AB$, then $m\angle B > m\angle C$.
If $m\angle A > m\angle C$, then $BC > AB$.

Example 1 **List the angles in order from smallest to largest measure.**



$\angle T, \angle R, \angle S$

Example 2 **List the sides in order from shortest to longest.**

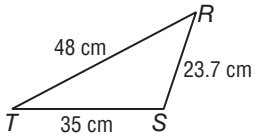


$\overline{CB}, \overline{AB}, \overline{AC}$

Exercises

List the angles and sides in order from smallest to largest.

1.



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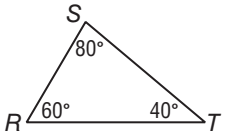

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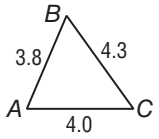

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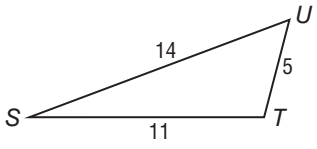

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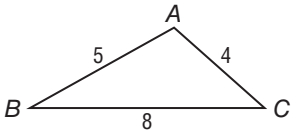

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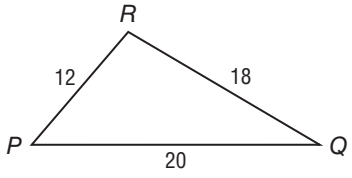

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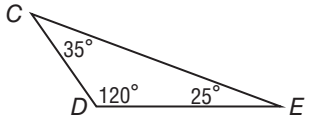

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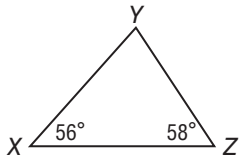

9.