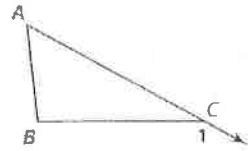
LESSON 5-3 Inequalities in One Triangle

Target: I will be able to recognize relationships between sides and angles of triangles

Theorem 5.8 Exterior Angle Inequality

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

Example: $m\angle 1 > m\angle A$
$m\angle 1 > m\angle B$

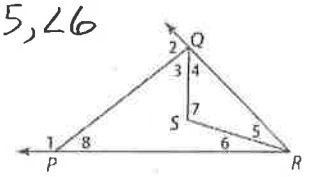


Example 1 Use the Exterior Angle Inequality Theorem

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

1A. measures less than $m\angle 1$ $\angle 3, \angle 4, \angle 5, \angle 6$

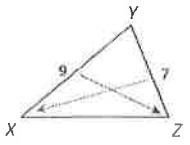
1B. measures greater than $m\angle 8$ $\angle 2$



Theorems Angle-Side Relationships in Triangles

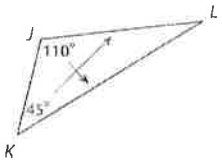
5.9 If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

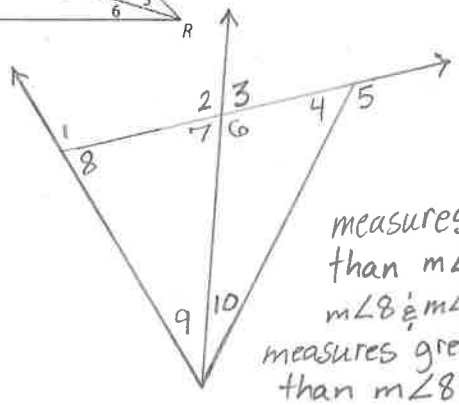
Example: $XY > YZ$, so $m\angle Z > m\angle X$.



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.

Example: $m\angle J > m\angle K$, so $KL > JL$.



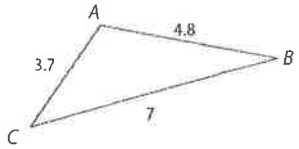


measures less than $m\angle 2$: $m\angle 8$ & $m\angle 9$

measures greater than $m\angle 8$: $m\angle 2, m\angle 6$, & $m\angle 5$

Guided Practice

2. List the angles and sides of $\triangle ABC$ in order from smallest to largest.



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

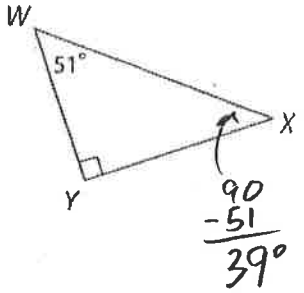
$\angle B, \angle C, \angle A$

GuidedPractice

3. List the angles and sides of $\triangle WXY$ in order from smallest to largest.

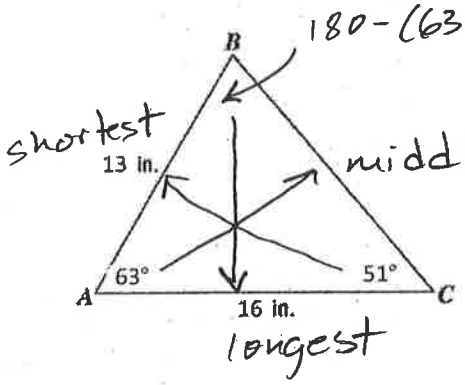
$\angle X, \angle W, \angle Y$

$\overline{WY}, \overline{XY}, \overline{WX}$



90
-51
39°

4. Jennifer made these measurements on $\triangle ABC$. $\overline{BC}$ must be _____.



180 - (63+51) = 66

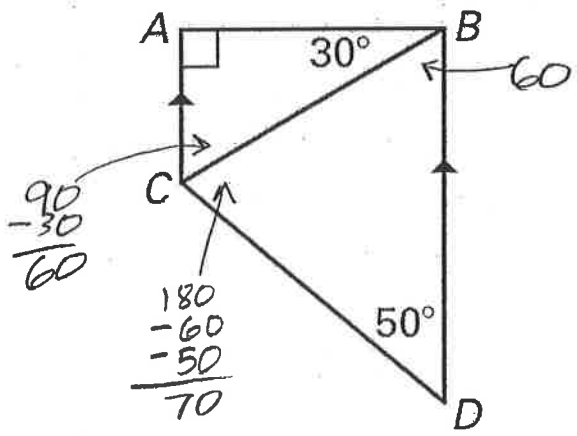
shortest

middle

longest

$\overline{BC}$ must be between 13 & 16 in

5. List the sides in order from shortest to longest.



90
-30
60

180
-60
-50
70

$\overline{BC}$ is longest side of $\triangle ABC$ but shortest side of $\triangle BCD$, so start your ordering with $\triangle ABC$.

$\overline{AC}, \overline{AB}, \overline{BC}, \overline{CD}, \overline{BD}$