Geometry 5.3 $< >$

Recognize and apply properties of inequalities to the measures of the angles of a triangle

Recognize and apply properties of inequalities to the relationships between the angles and sides of a triangle

inequality $\leq \geq$

interior angle (of a triangle)

exterior angle (of a triangle)

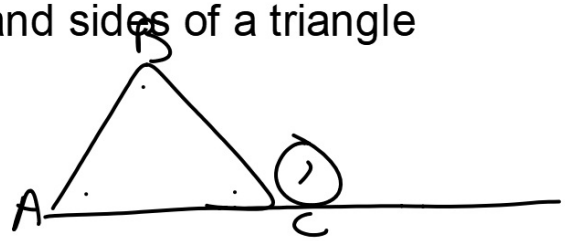
remote interior angles

comparison property

transitive property

addition property

subtraction property



$A+B+C=180$ $\angle 1+\angle C=180$

$A+B=\angle 1$

Quiz 5.1-5.2 moves to Tues.

A is more than B if...

KeyConcept Definition of Inequality

Words	For any real numbers a and b, $a > b$ if and only if there is a positive number c such that $a = b + c$.
Example	If $5 = 2 + 3$, then $5 > 2$ and $5 > 3$.

$5 = 2 + 3$

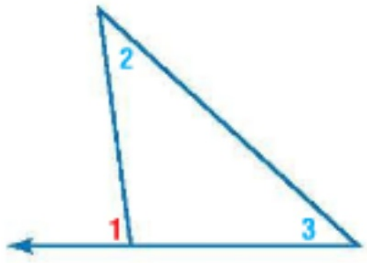
$5 > 2$

$5 > 3$

$a = b + c$

$a > b$

$a > c$



$m\angle 1 = m\angle 2 + m\angle 3$

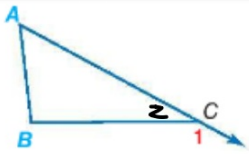
$m\angle 1 > m\angle 2$

$m\angle 1 > m\angle 3$

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.

a. measures less than $m\angle 7$

$m\angle 7 > m\angle 4$

$m\angle 7 > m\angle 1$

$m\angle 7 > m\angle JKL$

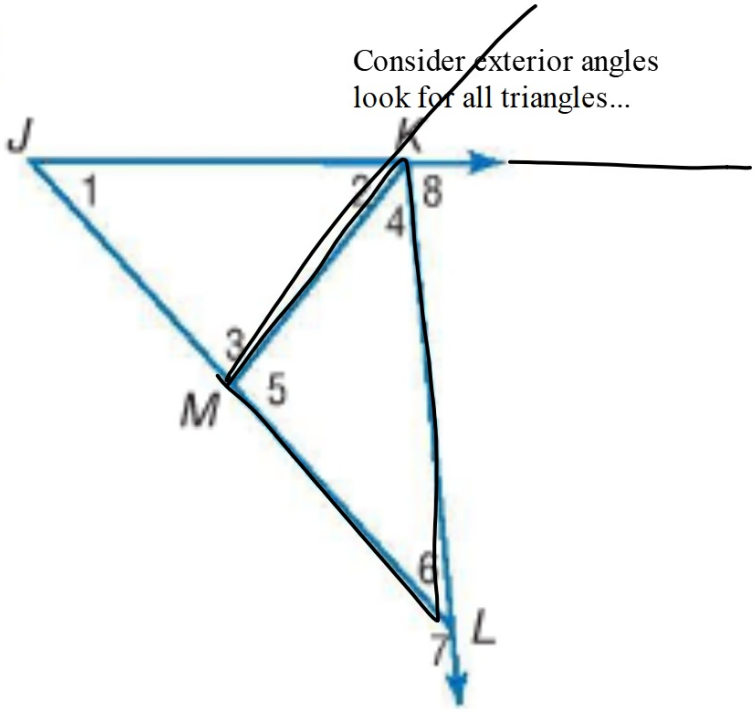
$m\angle 7 > m\angle 5$

b. measures greater than $m\angle 6$

$m\angle 3 > m\angle 6$

$m\angle 8 > m\angle 6$

Consider exterior angles look for all triangles...



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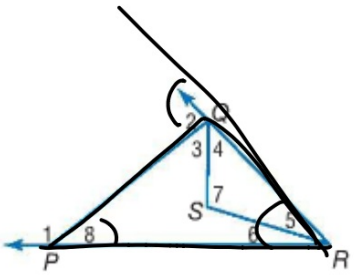
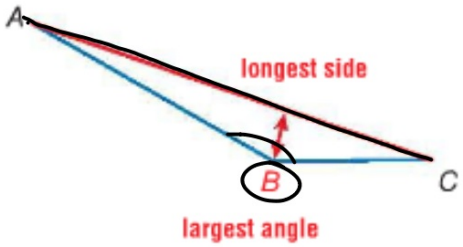
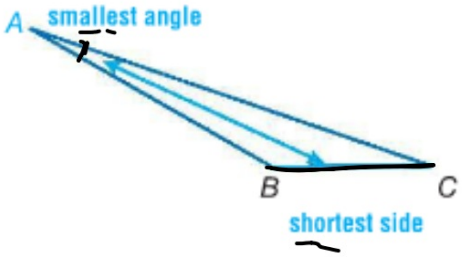
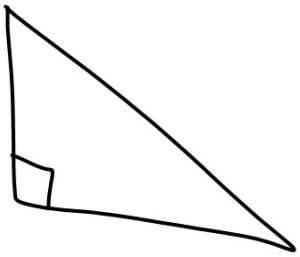
1A. measures less than $m\angle 1$

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




A
longest side
B
C
largest angle


A
smallest angle
B
C
shortest side

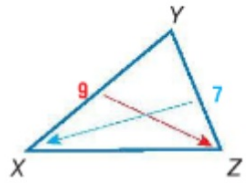


converse...

Theorems Angle-Side Relationships in Triangles

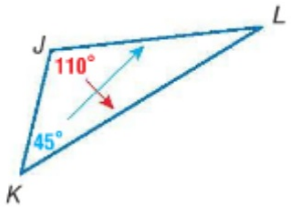
5.9 If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

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.

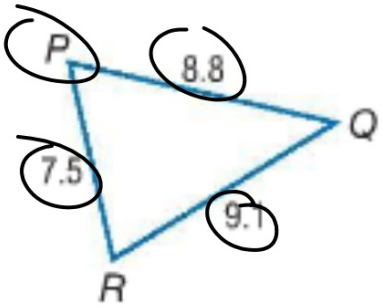
Example: $m\angle J > m\angle K$, so $KL > JL$.

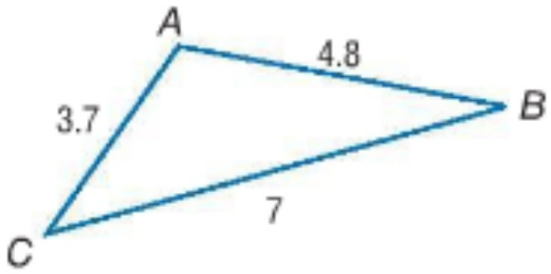


Example 2 Order Triangle Angle Measures

List the angles of $\triangle PQR$ in order from smallest to largest.

$\angle Q, \angle R, \angle P$



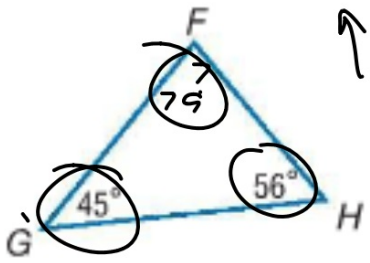


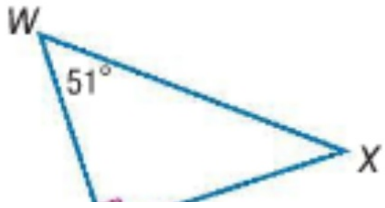
Example 3 Order Triangle Side Lengths

List the sides of $\triangle FGH$ in order from shortest to longest.

Need to know all three angles...

$\overline{EH}, \overline{FG}, \overline{GH}$





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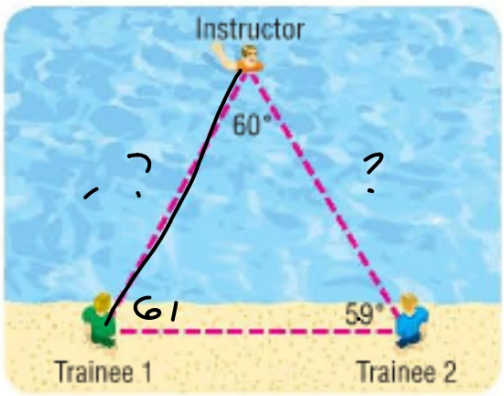
4. LIFEGUARDING During lifeguard training, an instructor simulates a person in distress so that trainees can practice their rescue skills. If the instructor, Trainee 1, and Trainee 2 are located in the positions shown on the diagram, which of the two trainees is closest to the instructor?



5.3 p. 348

9-29 odd

53-59 odd