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

interior angle (of a triangle)

exterior angle (of a triangle)

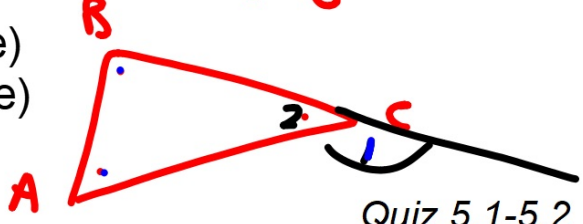
remote interior angles

comparison property

transitive property

addition property

subtraction property



Quiz 5.1-5.2 Tues.

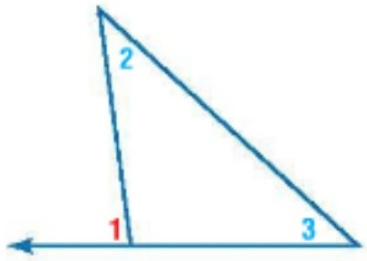
A is more than B if...

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 $5 > 3$.

$5 > 3$
$+1 \quad +1$
$6 > 4$

$10 < 20$
$-5 \quad -5$
$5 < 15$



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

$\angle 1 > \angle 2$

$\angle 1 > \angle 3$

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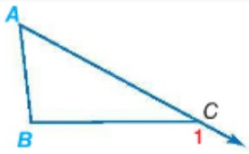
Theorem 5.8 Exterior Angle Inequality

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 $m\angle 7$

$\angle 7 > \angle 4$

$\angle 7 > \angle 5$

$\angle 7 > \angle 1$

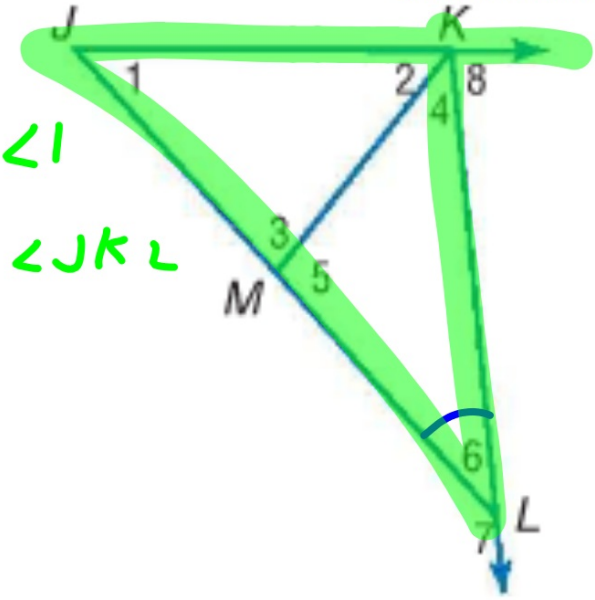
$\angle 7 > \angle JKL$

b. measures greater than $m\angle 6$

$\angle 3 > \angle 6$

$\angle 8 > \angle 6$

Consider exterior angles look for all triangles...



∠1 < ∠PQR
∠1 < ∠QMP

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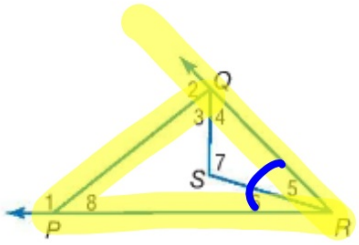
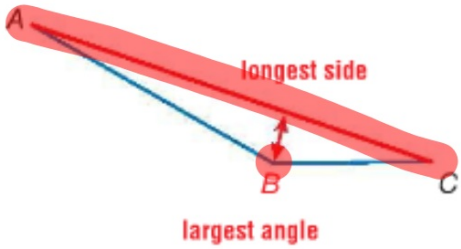
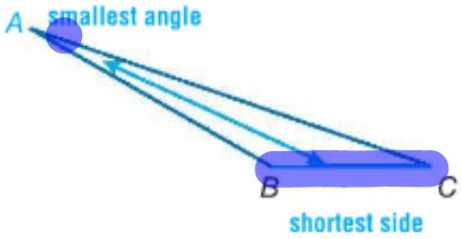
1A. measures less than $m\angle 1$

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



∠2 > ∠8


A
longest side
B
C
largest angle


A
smallest angle
B
C
shortest side

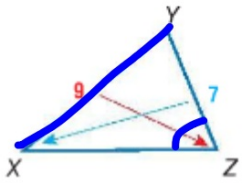
converse...



Theorems Angle-Side Relationships in Triangles

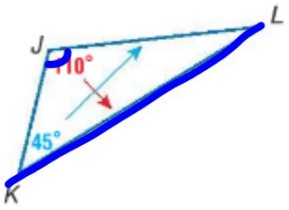
5.9 If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

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.

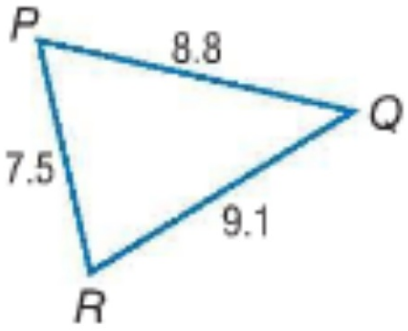
Example: $m\angle J > m\angle K$, so $KL > JL$.

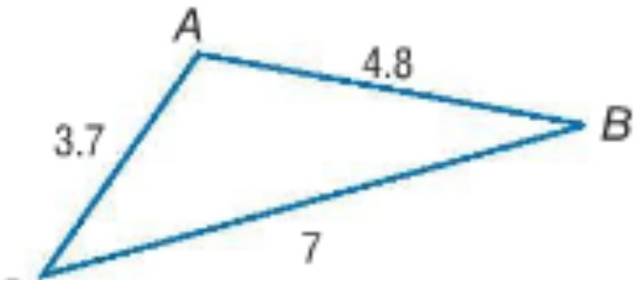


Example 2 Order Triangle Angle Measures

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

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

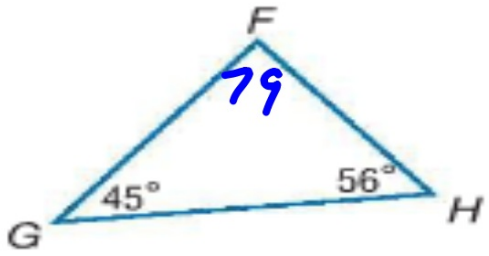




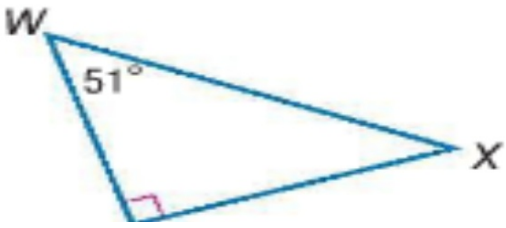
Need to know all three angles...

Example 3 Order Triangle Side Lengths

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



$\overline{FH}, \overline{GF}, \overline{GH}$



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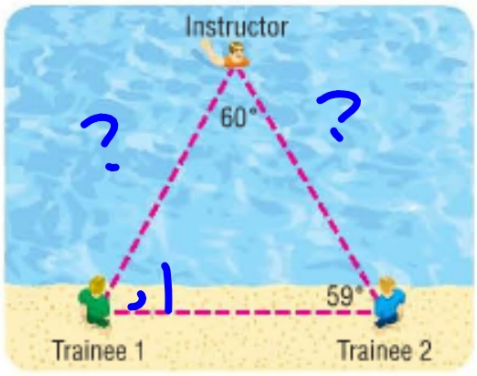
4. LIFEGUARDING During lifeguard training, an instructor simulates a person in distress so that trainees can practice their rescue skills. If the instructor, Trainee 1, and Trainee 2 are located in the positions shown on the diagram, which of the two trainees is closest to the instructor?

T 1



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9-39 odd