Objectives: *You will be able to apply properties of inequalities to the relationships between angles and sides of a triangle and use the triangle inequality theorem to find possible side lengths of triangles.*

Angle - Side Relationships

→ If 2 sides of a triangle are not **congruent,** then the larger angle lies **opposite** the **longer** side.

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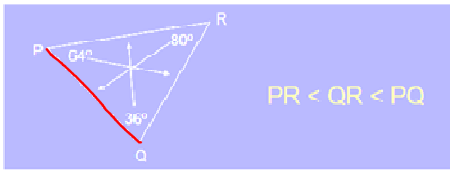
→ If 2 angles of a triangle are not **congruent,** then the longer side lies **opposite** the **larger** angle.



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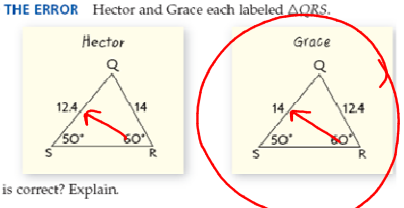
Example 1: FIND THE ERROR Hector and Grace each labeled $\triangle QRS$.



Who is correct? Explain.

Grace b/c she put the larger side opp. the larger angle.

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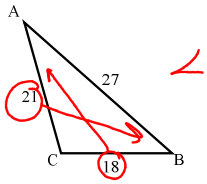
Example 2: List the angles in $\triangle ABC$ in order from the smallest to the greatest.



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

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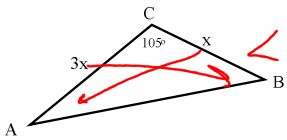
Example 3: List the angles in $\triangle ABC$ in order from the smallest to the greatest.



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

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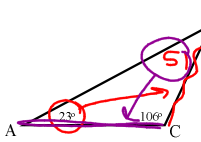
Example 4: List the sides of $\triangle DEF$ in order from least to greatest.



$106 + 123 = 129$

$180 - 129 = 51$

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

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Example 5: **BASEBALL** During a baseball game, the batter hits the ball to the third baseman and begins to run toward first base. At the same time, the runner on first base runs toward second base. If the third baseman wants to throw the ball to the nearest base, to which base should he throw? Explain.

throw to 2nd

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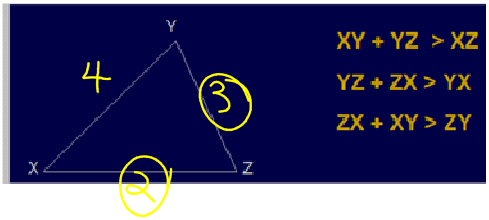
Objectives: *You will be able to apply the triangle inequality theorem.*

Triangle Inequality Theorem: The sum of the lengths of any two sides of a triangle is greater then the length of the third side



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Example 6: Can a triangle have sides with the given lengths?

3ft, 7ft, & 8ft

3+7=10>8 ✓

yes

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Example 7: Can a triangle have sides with the given lengths?

1in, 2in, & 5in

1+2=3 ≯ 5

No

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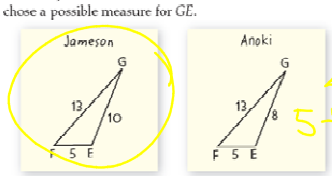
Example 8:

FIND THE ERROR Jameson and Anoki drew $\triangle EFG$ with $FG = 13$ and $EF = 5$. They each chose a possible measure for GE.



Who is correct? Explain.

5+8=13

Jameson b/c 5+10>13

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Example 9: The lengths of two sides are given. Describe the lengths possible for the third side.

8cm & 10cm

8+10=18

10-8=2

2cm < x < 18cm

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Example 10: The lengths of two sides are given. Describe the lengths possible for the third side.

23yd & 12yd $11yd < x < 35yd$

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