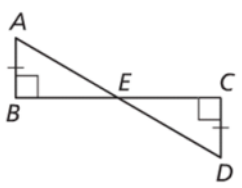
5.5 Inequalities in Two Triangles

Monday, September 23, 2019 7:46 AM

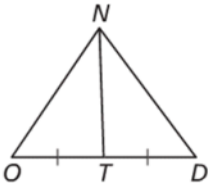
Warm Up

Determine if you can prove the two triangles are congruent. If they are congruent, explain your reasoning.

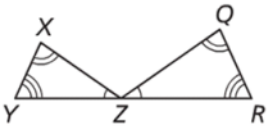
1. $\triangle ABE$ and $\triangle DCE$



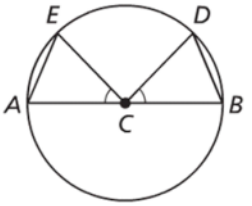
2. $\triangle NOT$ and $\triangle NDT$



3. $\triangle XYZ$ and $\triangle QRZ$



4. $\triangle CDB$ and $\triangle CEA$



Essential Question

When two triangles have two pairs of congruent sides, how are the third pair of sides and the pair of angles opposite the third sides related?

Goal: "I can. . .

Compare a pair of sides of two triangles when the remaining pairs of sides are congruent."

With your Groups

- You're going to be drawing 3 triangles. Before you draw, as a table pick what you want two of the three sides lengths to be,

and then draw an acute, obtuse and right triangle making sure that two of your sides are the dimensions your table chose.

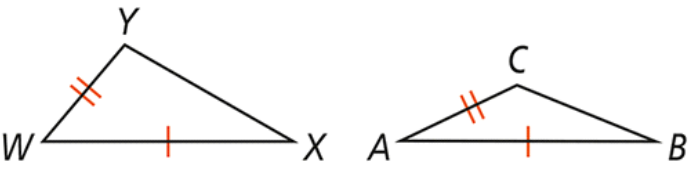
- Can your table come up with a conjecture about the relationship to the third side when comparing the acute, the right and the obtuse triangles together?
- Work with a table near you to figure out a conjecture that works.

Hinge Theorem

If two sides of one triangle are congruent to two sides of another triangle, and the included angles are not congruent, then the longer third side is opposite the larger included angle.

PROOF: SEE EXERCISE 9.

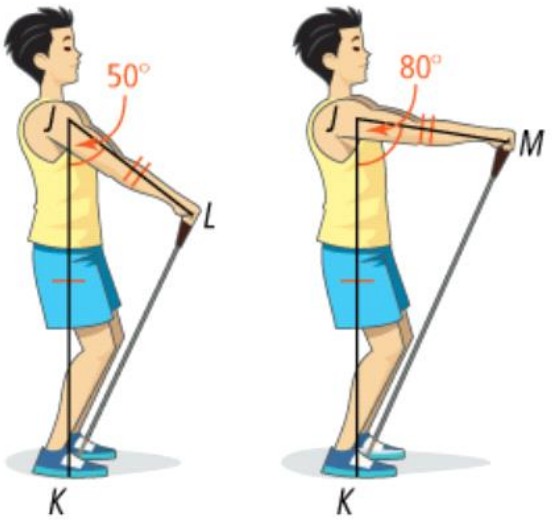
If... $m\angle YWX > m\angle CAB$



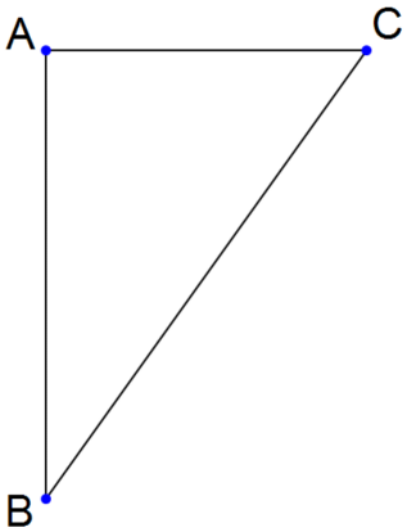
Then... $XY > BC$

Example 1

The tension on an exercise band grows the longer the length the band is stretched to. In the diagram which position has higher tension?



In the following diagram, angle A is 90°. Keeping AB and AC the same, what would happen to the length of BC as angle A went to 124°? 63°?

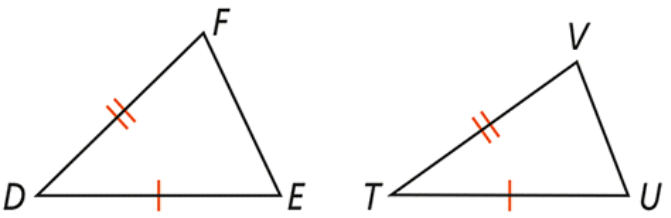


Converse to the Hinge Theorem

If two sides of one triangle are congruent to two sides of another triangle, and the third sides are not congruent, then the larger included angle is opposite the longer third side.

PROOF: SEE EXAMPLE 3.

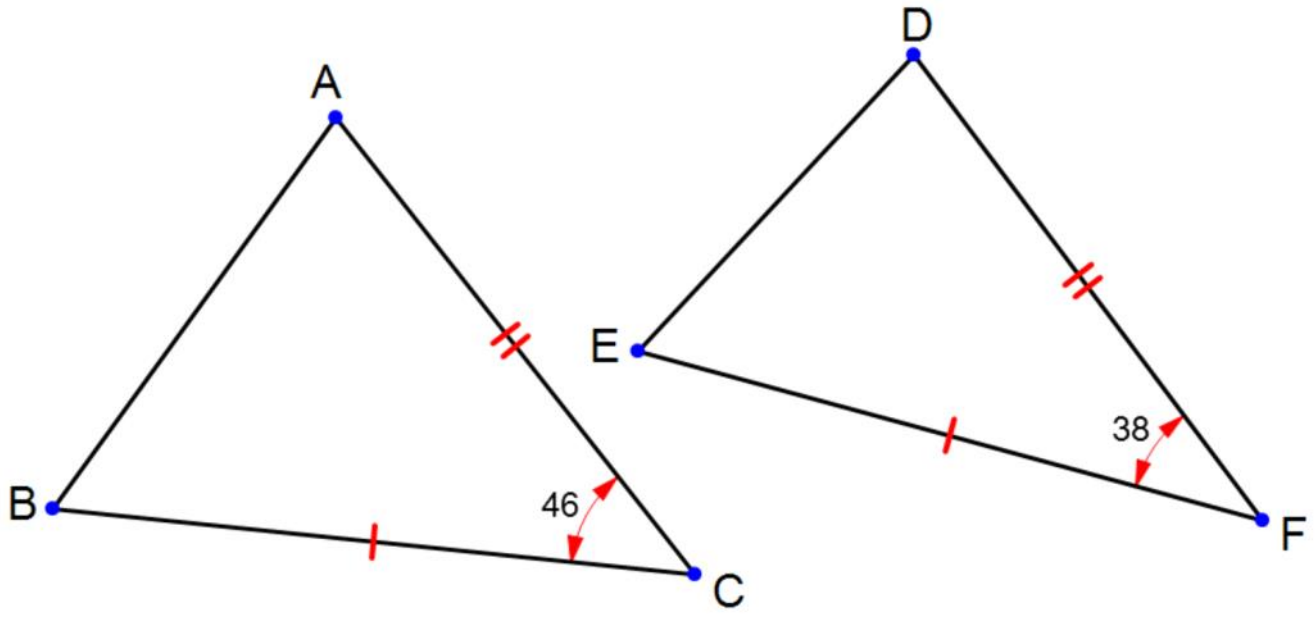
If... $EF > UV$



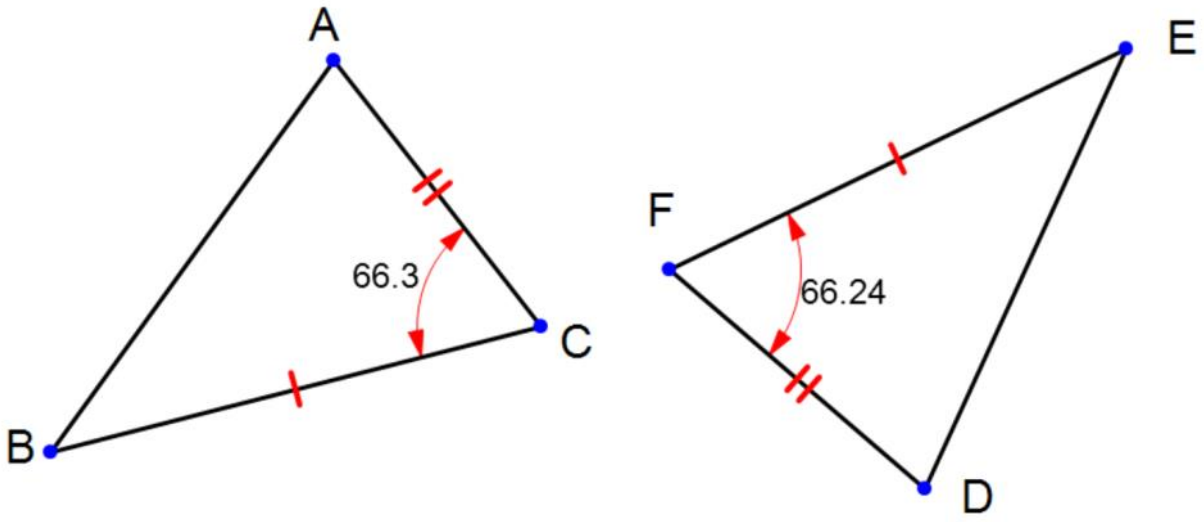
Then... $m\angle D > m\angle T$

Example 2

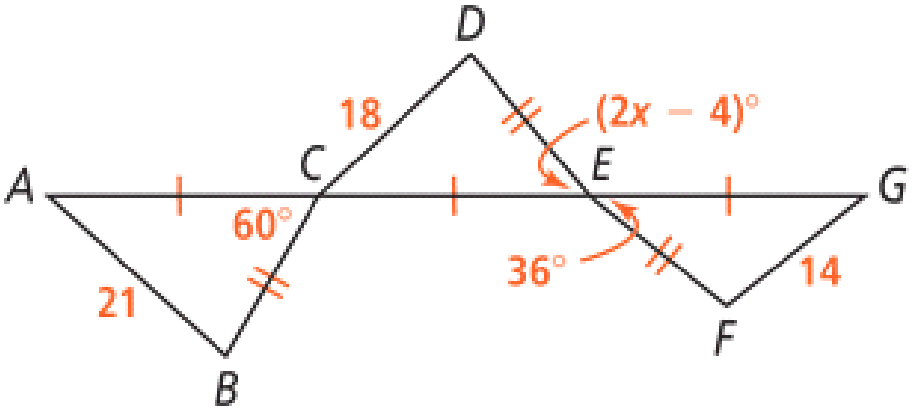
How do the lengths of AB and DE compare?



How do the lengths of AB and DE compare?



What are the possible values of x?



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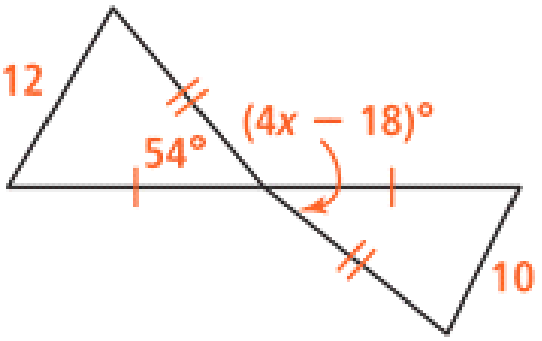

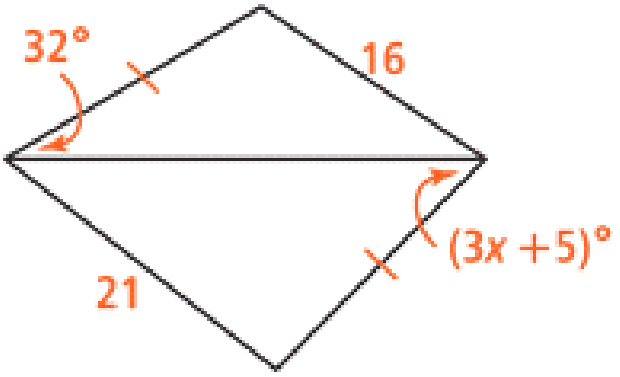

Homework

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