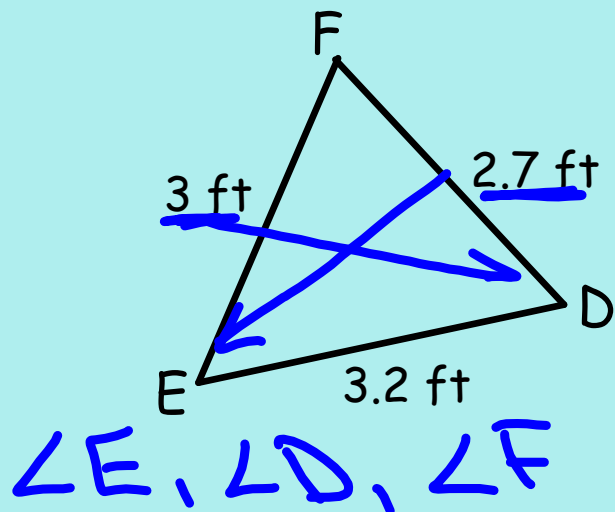
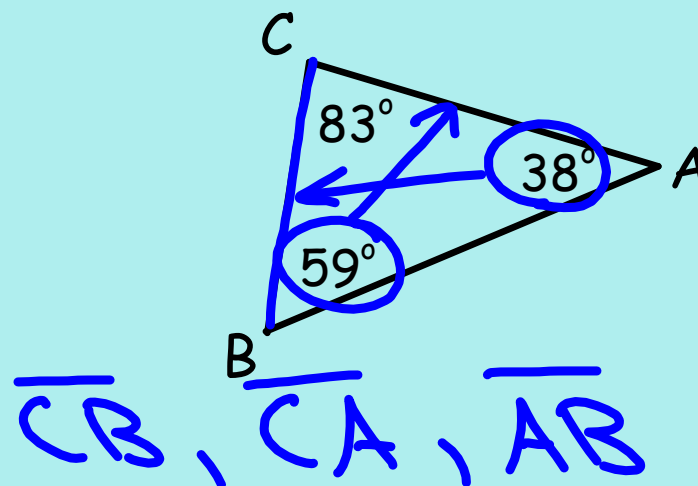


12/3/19 - Warm Up Problem

Put the angles in order from least to greatest.



Put the sides in order from shortest to longest.



Concept 13 - Triangle Inequalities

Goal: Determine if 3 sides lengths will form a triangle

Spaghetti Geometry

Can you make a triangle out of any three pieces or do they have to be certain lengths?

1. Break five pieces of spaghetti to be 3 inches, 4 inches, 5 inches, 7 inches, and 8 in.

2. Use the 3 in, 4 in, and 5 in. pieces.

• do they make a triangle? *yes*

3. Use the 3 in, 4 in, and 7 in. pieces.

• do they make a triangle?



4. Use the 3 in, 4 in, and 8 in. pieces.

• do they make a triangle?



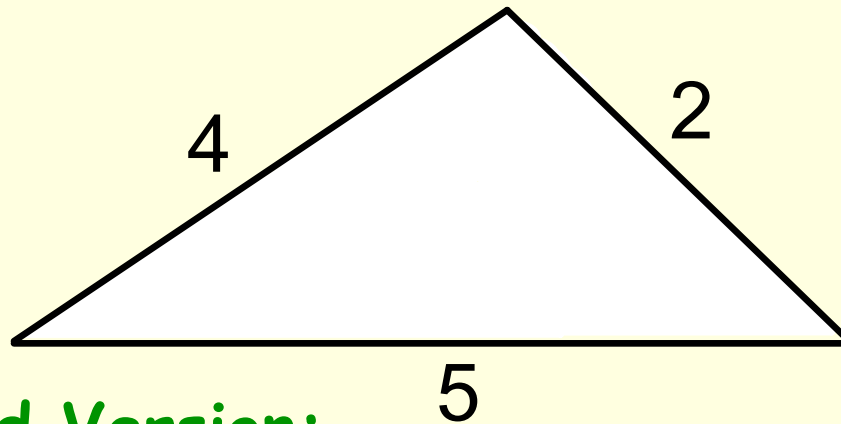
5, 7, 8

3, 7, 8

4, 7, 8

Triangle Inequality Theorem

The sum of the lengths of any two sides of a triangle is **greater than** the length of the third side.



Simplified Version:

The two short sides must add up to be greater than the longest side.

Using the Triangle Inequality Theorem

Determine whether the given measures can be the lengths of the sides of a triangle.

1. $\underline{5}, \underline{7}, 8$ *yes*

2. $4.2, 4.2, \underline{8.4}$ *NO*

3. $10, \underline{3}, \underline{6}$ *NO*

4. $13, 11, 3$

Finding Possible Side Lengths

A triangle has sides of lengths 8 cm and 10 cm. Describe the lengths possible for the third side.

Step 1: What if the side you're missing is the longest side?

$$\begin{aligned} 8 + 10 &> x \\ 18 &> x \end{aligned}$$

Step 2: What if the side you're missing is a shorter side?

$$\begin{aligned} x + 8 &> 10 \\ x &> 2 \end{aligned}$$

Step 3: Write the range as a compound inequality.

$$2 < x < 18$$

Finding Possible Side Lengths

If two sides of a triangle are 10 inches and 23 inches, write a range of possible lengths for the third side of the triangle.

Do this one in your notes...

If two sides of a triangle are 5 inches and 9 inches long, write a range of possible lengths for the third side of the triangle.

$$4 < x < 14$$

$9-5$ $9+5$

Assignment:
Concept 13 Worksheet
(back)

Will sides of these lengths form a triangle?

15. 2, 4, 6

NO

16. 4, 5, 7

17. 5, 11, 17

18. 10, 14, 15

19. 5, 5, 10

20. 24, 25, 38

Two sides of a triangle are given to you. Write a compound inequality to represent how long the third side of the triangle could be.

21. 2 cm and 5 cm

$$3 < x < 7$$

22. 7 in and 12 in

23. 4 feet and 10 feet

24. 11 meters and 10 meters

25. 9 in and 25 in

26. 1 mile and 8 miles