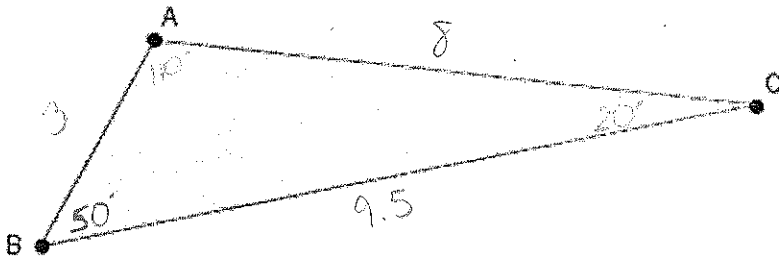


**Objectives:** Discover and apply inequalities (not equal) in one triangle. *Problem solving.*

**Exploration #1:** Measure the angles and sides (in cm.) of  $\triangle ABC$  to answer the questions.

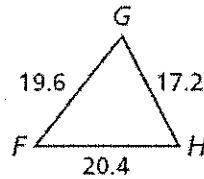


**Discovery:**

- BC is the largest side, which is opposite from  $\angle A$ , the largest angle.
- AB is the smallest side, which is opposite from  $\angle C$ , the smallest angle.

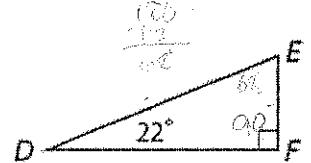
**EX 1:** Write the **angles** in order from *smallest to largest*.

F < H < G



**EX 2:** Write the **sides** in order from *smallest to largest*.

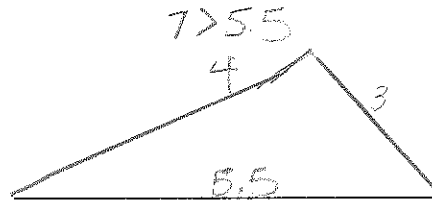
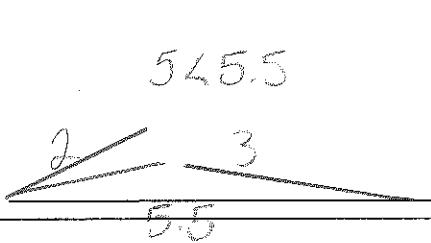
EF < DF < DE



**Exploration #2:** Add 2 side lengths to the given side to create a triangle.

2 cm. & 3 cm.

4 cm. and 3 cm.



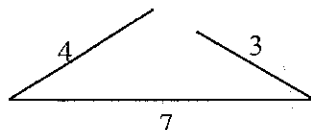
**Triangle Inequality Theorem:**

The sum of any two sides is greater than the third.

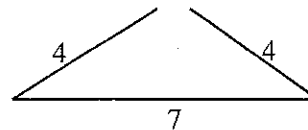
**EX 3:** Will the following lengths create a triangle? YES / NO



YES / NO



YES / NO



YES / NO

**Trick:**

In a triangle, the sum of the 2 smaller sides should be greater than the 3rd.

**EX 4:** Can the following set of side lengths create a triangle?

a) 7, 10, 19

$7 + 10 < 19$

YES / NO

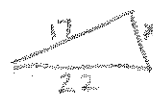
b) 3.5, 4.5, 6.5

$3.5 + 4.5 > 6.5$

YES / NO

**EX 5:** The lengths of two sides of a triangle are 17 & 22 inches. Find the **range** of possible lengths for the third side. Sketch options.

$17 + 22 > x$   
 $39 > x$   
 $5 < x < 39$



or



**Trick:**

Given 2 sides of a triangle, subtract to get the minimum of 3rd side and add to get

5 < x < 39 max