Name: Date: .

*Triangle Inequality Theorem Student Handout*

**Do Now:** List all of the characteristics of a *triangle* that you can think of:

Discovering the Triangle Inequality Theorem

**Strings:** **Pink** = 2 in, **Yellow** = 3 in, **Orange** = 4 in,

**Green** = 5 in, **Blue** = 6 in, **Purple** = 7 in, **White** = 8 in

**Step 1. Letter A – D:** Use the three given lengths of string to form a triangle. Write if it possible or not possible to create a proper triangle using those lengths in the fourth column of the data table below.

**Step 2. Letter E – G:** Create your own triangles. If some length(s) are given, fill in the blank columns with a length of your choice. Just like in Step 1, test to see if the lengths form a proper triangle and record it in the fourth column of the data table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Length #1** | **Length #2** | **Length #3** | **Triangle or No Triangle?** |
| A) 2 in | 3 in | 5 in |  |
| B) 6 in | 7 in | 8 in |  |
| C) 3 in | 4 in | 5 in |  |
| D) 2 in | 4 in | 7 in |  |
| E) 4 in | 5 in |  |  |
| F) 2 in |  |  |  |
| G)  |  |  |  |

**Step 3.** **Make a conjecture.** What rule would apply to determining what set of lengths would successfully form a triangle? *Hint: Look for patterns in your data table!*

**Step 4. Cut your own lengths of string to create more triangles.** List three sets of lengths that will create proper triangles to validate your conjecture.

A)

B)

C)

**Step 5.** Final answer!

The Triangle Inequality Theorem states…



Practice Problems:

1. True or false, a triangle can have side lengths 3, 12, and 15.
2. True or false, a triangle can have side lengths 9, 10, and 15.
3. Which set of numbers could be the lengths of the sides of a triangle?
4. {6, 9, 15}
5. {6, 9 ,12}
6. {3, 3, 7}
7. {1, 2, 3}
8. Create a length to complete the missing side of this triangle.

 8 ?

7

1. List all of the possible lengths that could complete the missing side of this triangle.

 9 ?

13

1. In Δ*ABC*, *AB* = 5 inches and *BC* = 3 inches. Which of the choices represents all possible values for *AC*, in inches?
2. $3<AC<7$
3. $3\leq AC\leq 7$
4. $2<AC<8$
5. $2\leq AC\leq 8$
6. In Δ*DOG,*point *C* lies on the side of the triangle between points *D* and *O*. *DG* = 5, *GO* = 12, and *DC* = 3.
Which choice is a possible value for *CO*?
7. 4
8. 14
9. 11
10. 15
11. Triangle *TAB* has a perimeter of 40 cm. True or false, the measures of the sides, as shown, could actually represent the measures of the sides of the triangle.



*Practice Problems from: https://mathbitsnotebook.com/Geometry/SegmentsAnglesTriangles/SATIriangleInequalPractice.html*