Warm Up

Think about and jot down some responses to the following question - **what is required in order to create a triangle?**

For example, is it possible to have a triangle with the following side lengths - 3 units, 4 units, and 25 units?

2.3.1 - Triangle Inequality

Aim: How can I determine when 3 side lengths will form a triangle?

When will we have a triangle?

Each group has been provided with rulers, as well as pasta. With these tools, you will determine if a triangle can be made using ***any*** three side lengths.

Before we begin, let's hear some conjectures - do you think we can use any three side lengths to make a triangle? Justify your answer.

Experiment

Using your materials, try to build a triangle using the following side lengths:

1. 3cm, 5cm, and 10cm
2. 4cm, 9cm, and 12cm
3. 2cm, 4cm, and 5cm
4. 3cm, 5cm, and 8cm

While working think about and jot down a response to the following questions: **What conditions make it impossible to build a triangle?**

For triangles that could not be build - what happened? Why were they impossible?

Think about it...

If you're given two sides of a triangle that are 5cm and 12cm long, respectively, ***what is the longest length that the third side could be so that you have a triangle? How about the shortest length?*** Use your pasta to investigate this.

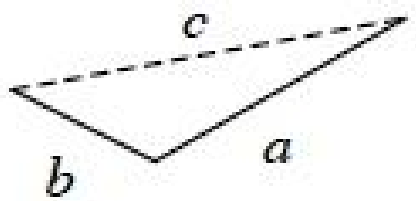
Desmos tool

The values you found are the *minimum* and *maximum* limits for the length of the third side of any triangle with sides of 5cm and 12cm.

Triangle Inequality

In a triangle with side lengths a, b, and c, c must be less than the sum of a and b and greater than the difference of a and b.

In the example below, a is greater than b (that is, $a > b$), so the possible values for c are all numbers such that $c > a - b$ and $c < a + b$.



Practice

Work on page 293 #16-27 in the purple textbook.