## Lesson 9: Drawing Triangles (Part 1)

Let’s see how many different triangles we can draw with certain measurements.

### 9.1: Which One Doesn’t Belong: Triangles

Which one doesn’t belong?



### 9.2: Does Your Triangle Match Theirs?

Three students have each drawn a triangle. For each description:

* Draw a triangle with the given measurements.
* Measure and label the other side lengths and angle measures in your triangle.
* Decide whether the triangle you drew must be an identical copy of the triangle that the student drew. Explain your reasoning.
1. Jada’s triangle has one angle measuring $75^{∘}$.
2. Andre’s triangle has one angle measuring $75^{∘}$ and one angle measuring $45^{∘}$.
3. Lin’s triangle has one angle measuring $75^{∘}$, one angle measuring $45^{∘}$, and one side measuring 5 cm.

### 9.3: How Many Can You Draw?

1. Draw as many different triangles as you can with each of these sets of measurements:
	1. Two angles measure $60^{∘}$, and one side measures 4 cm.
	2. Two angles measure $90^{∘}$, and one side measures 4 cm.
	3. One angle measures $60^{∘}$, one angle measures $90^{∘}$, and one side measures 4 cm.
2. Which of these sets of measurements determine one unique triangle? Explain or show your reasoning.

#### Are you ready for more?



In the diagram, 9 toothpicks are used to make three equilateral triangles. Figure out a way to move only 3 of the toothpicks so that the diagram has exactly 5 equilateral triangles.

### Lesson 9 Summary

Sometimes, we are given two different angle measures and a side length, and it is impossible to draw a triangle. For example, there is no triangle with side length 2 and angle measures $120^{∘}$ and $100^{∘}$:



Sometimes, we are given two different angle measures and a side length between them, and we *can* draw a unique triangle. For example, if we draw a triangle with a side length of 4 between angles $90^{∘}$ and $60^{∘}$, there is only one way they can meet up and complete to a triangle:



Any triangle drawn with these three conditions will be identical to the one above, with the same side lengths and same angle measures.



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