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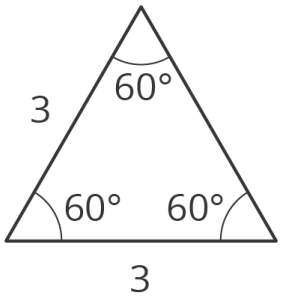
Unit 7, Lesson 9: Drawing Triangles (Part 1)

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

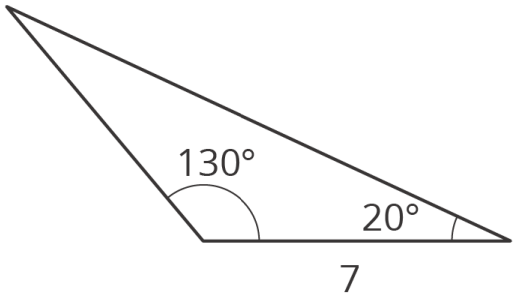
9.1: Which One Doesn't Belong: Triangles

Which one doesn't belong?

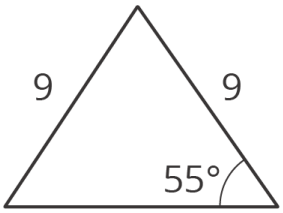
A



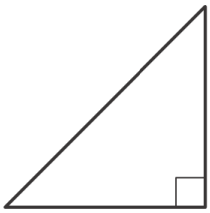
B



C



D



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9.2: Does Your Triangle Match Theirs?

m.openup.org/1/7-7-9-2

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

1. Draw a triangle with the given measurements.
2. Measure and label the other side lengths and angle measures in your triangle.
3. Decide whether the triangle you drew must be an identical copy of the triangle that the student drew. Explain your reasoning.

- Jada's triangle has one angle measuring 75°.

- Andre's triangle has one angle measuring 75° and one angle measuring 45°.

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- 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?

m.openup.org/1/7-7-9-3

1. Draw as many different triangles as you can with each of these sets of measurements:

   a. Two angles measure 60°, and one side measures 4 cm.

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b. Two angles measure 90°, and one side measures 4 cm.

c. 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.

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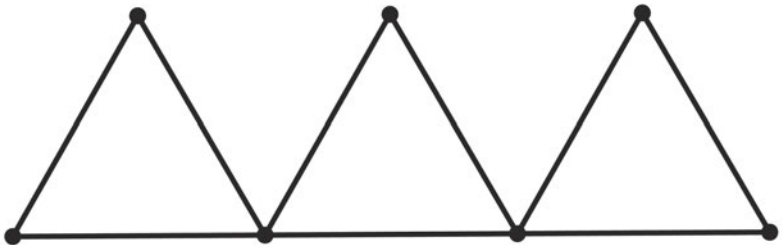
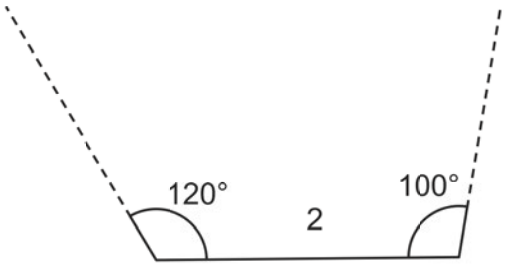
Are you ready for more?



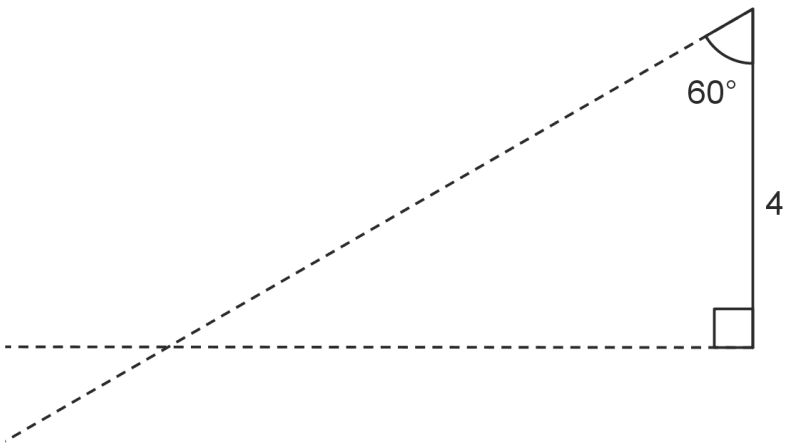
In the diagram, 9 toothpicks are used to make three equilateral triangles. Figure out a way to move only 3 of the toothpicks so that the diagram has exactly 5 equilateral triangles.

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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Unit 7, Lesson 9: Drawing Triangles (Part 1)

1. Use a protractor to try to draw each triangle. Which of these three triangles is impossible to draw?

   a. A triangle where one angle measures 20° and another angle measures 45°
   b. A triangle where one angle measures 120° and another angle measures 50°
   c. A triangle where one angle measures 90° and another angle measures 100°

2. A triangle has an angle measuring 90°, an angle measuring 20°, and a side that is 6 units long. The 6-unit side is in between the 90° and 20° angles.

   a. Sketch this triangle and label your sketch with the given measures.
   b. How many unique triangles can you draw like this?

3. a. Find a value for x that makes $-x$ less than $2x$.

   b. Find a value for x that makes $-x$ greater than $2x$.

(from Unit 5, Lesson 13)

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4. One of the particles in atoms is called an electron. It has a charge of -1. Another particle in atoms is a proton. It has charge of +1.

   The overall charge of an atom is the sum of the charges of the electrons and the protons. Here is a list of common elements.

	charge from electrons	charge from protons	overall charge
carbon	-6	+6	0
aluminum	-10	+13	
phosphide	-18	+15	
iodide	-54	+53	
tin	-50	+50	

   Find the overall charge for the rest of the atoms on the list.

   (from Unit 5, Lesson 3)

5. A factory produces 3 bottles of sparkling water for every 7 bottles of plain water. If those are the only two products they produce, what percentage of their production is sparkling water? What percentage is plain?

   (from Unit 4, Lesson 3)