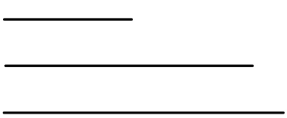
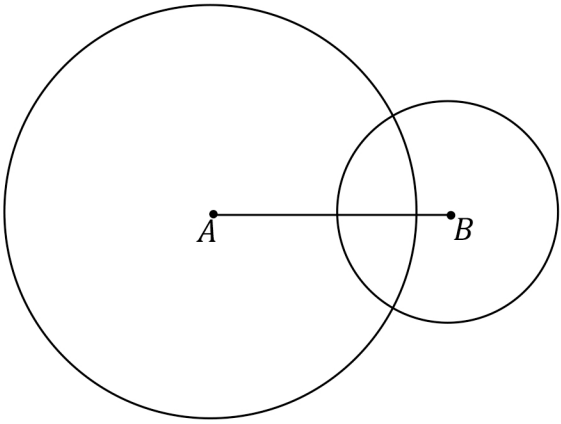
Drawing Triangles

1. A student is given the following three side lengths of a triangle to use to draw a triangle.



The student uses the longest of the three segments as side of triangle . Explain what the student is doing with the two shorter lengths in the work below. Then complete drawing the triangle.



2. Explain why the three triangles constructed in the lesson today (Exploratory Challenge parts (c), (d), and (e)) were non-identical.

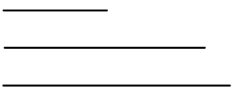
1. Draw three different acute triangles , , and so that one angle in each triangle is . Label all sides and angle measurements. Why are your triangles not identical?

2. Draw three different equilateral triangles , , and . A side length of is cm. A side length of is cm. A side length of is cm. Label all sides and angle measurements. Why are your triangles not identical?

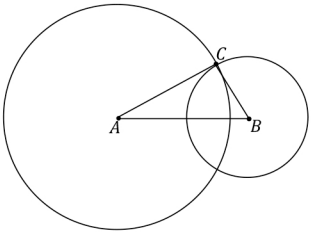
3. Draw as many isosceles triangles that satisfy the following conditions: one angle measures and one side measures cm. Label all angle and side measurements. How many triangles can be drawn under these conditions?

4. Draw three non-identical triangles so that two angles measure and and one side measures cm.
   a. Why are the triangles not identical?
   b. Based on the diagrams you drew for part (a) and for Problem 2, what can you generalize about the criterion of three given angles in a triangle? Does this criterion determine a unique triangle?

1. **A student is given the following three side lengths of a triangle to use to draw a triangle.**



The student uses the longest of the three segments as side of triangle . Explain what the student is doing with the two shorter lengths in the work below. Then complete drawing the triangle.



The student drew a circle with center and a radius equal in length to the medium segment and a circle with center and a radius equal in length to the smallest segment. The points of the circle are all a distance equal to the medium segment from point and the points of the circle are all a distance equal to the smallest segment from point . The point where the two circles intersect indicates where both segments would meet when drawn from and , respectively.

2. **Explain why the three triangles constructed in the lesson today (Exploratory Challenge parts (c), (d), and (e)) were non-identical.**

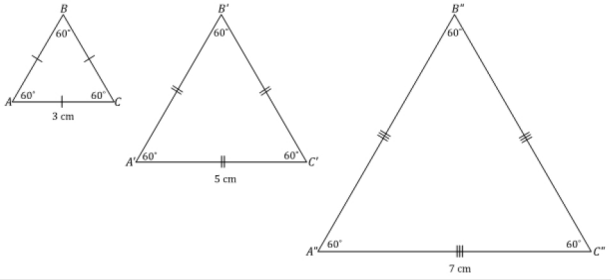
They were non-identical because the two angles and one side length could be arranged in different ways that affected the structure of the triangle. The different arrangements resulted in differences in angle measurements and side lengths in the remaining parts.

1. **Draw three different acute triangles , , and so that one angle in each triangle is . Label all sides and angle measurements. Why are your triangles not identical?**

Drawings will vary; the angle measurements are not equal from triangle to triangle so there is no correspondence that will match equal angles to equal angles.

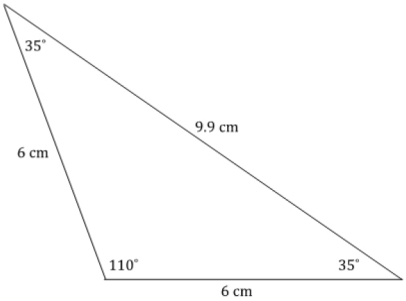
2. **Draw three different equilateral triangles , and . A side length of is cm. A side length of is cm. A side length of is cm. Label all sides and angle measurements. Why are your triangles not identical?**

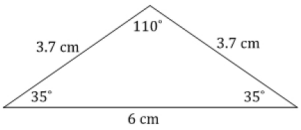
Drawings will vary; all angle measurements are . Though there is a correspondence that will match equal angles to equal angles, there is no correspondence that will match equal sides to equal sides.



3. Draw as many isosceles triangles that satisfy the following conditions: one angle measures and one side measures cm. Label all angle and side measurements. How many triangles can be drawn under these conditions?

Two triangles.

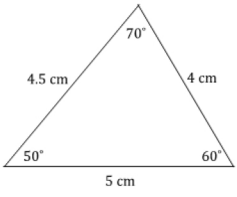


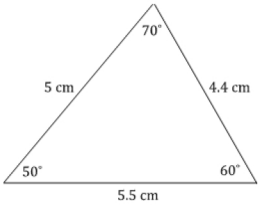


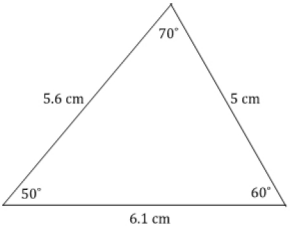
4. Draw three non-identical triangles so that two angles measure and and one side measures cm.

a. Why are the triangles not identical?

Though there is a correspondence that will match equal angles to equal angles, there is no correspondence that will match equal sides to equal sides.







b. Based on the diagrams you drew for part (a) and for Problem 2, what can you generalize about the criterion of three given angles in a triangle? Does this criterion determine a unique triangle?

No, it is possible to draw non-identical triangles that all have the same three angle measurements but have different corresponding side lengths.