Lesson 4.03
Half an Equilateral Triangle

Geometry GT

Recall

Sketch an equilateral triangle and an altitude from any vertex in the equilateral triangle. Recall that an altitude in a triangle is a line segment from a vertex to the opposite side that is perpendicular to that side. What do you notice? What do you wonder?

Explore

Here is an equilateral triangle with a side length of 2 units and an altitude drawn.
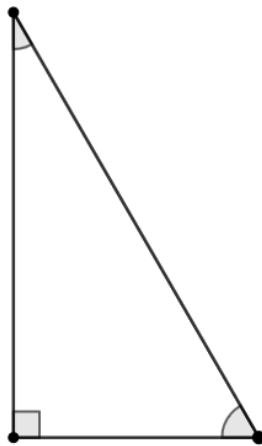
Find the values of x and y.
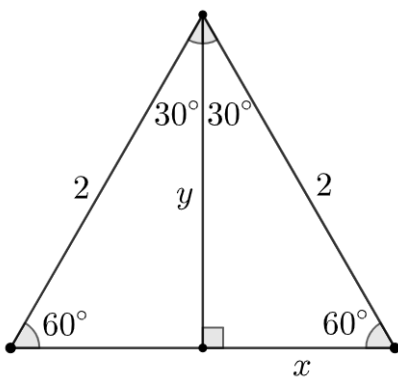
Using a compass and a straightedge, create another equilateral triangle with an altitude, and measure the sides and altitude. Compute the ratios of the side lengths of one triangle that makes up half the equilateral triangle.
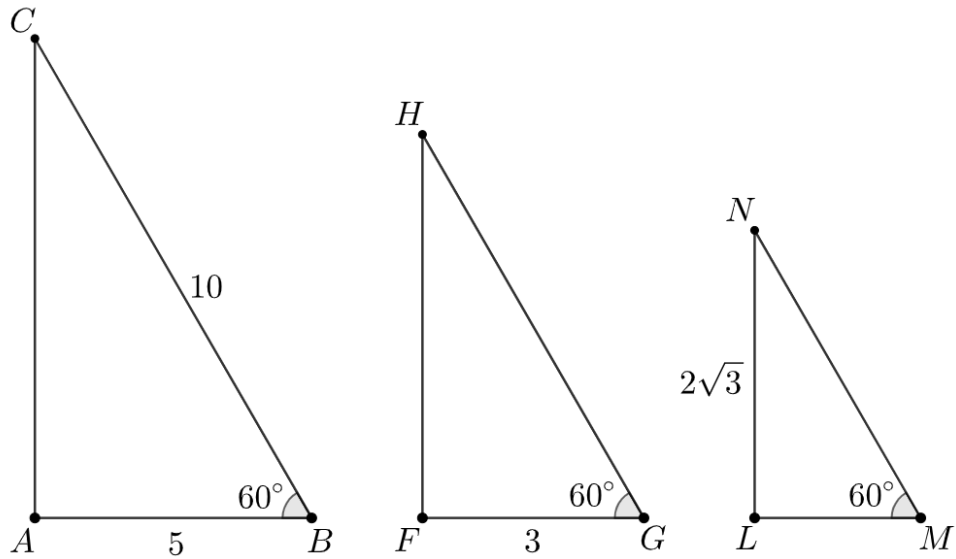
Make a conjecture about side lengths in the "half equilateral triangles."
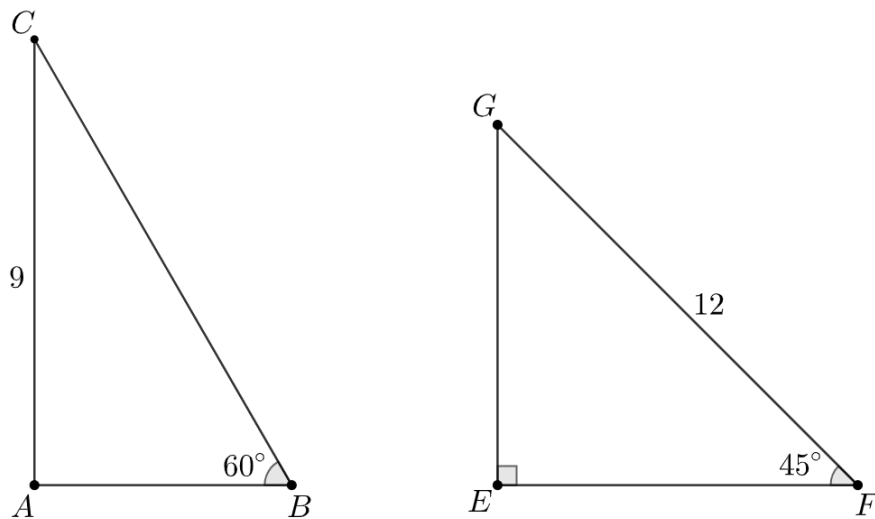
Special Right Triangles

Discuss

Calculate the lengths of the 5 unlabeled sides.
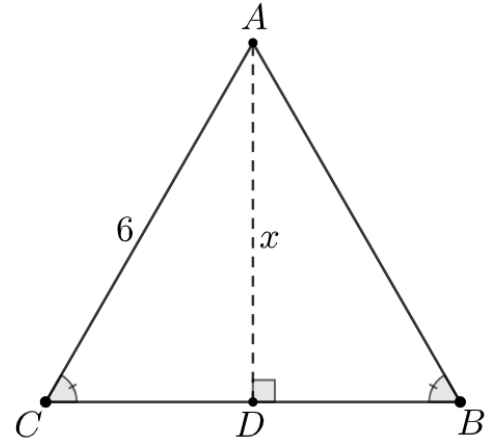

Demonstrate

Calculate the lengths of the 4 unlabeled sides. All radicals should be simplified, and any radicals must be in the numerator.
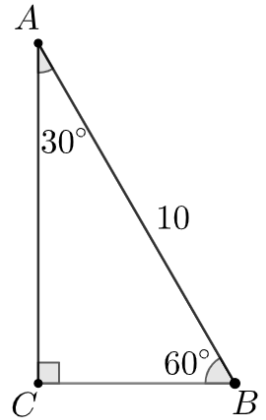
Practice

1. Select **all** statements that are true about equilateral triangle $\triangle ABC$.

    A. $m\angle B = m\angle C = 60°$

    B. $x = 3\sqrt{3}$

    C. $x = 6\sqrt{3}$

    D. $\triangle ABD \cong \triangle ACD$

    E. $BD = CD = 3$

2. Find the length of each leg.

3. An equilateral triangle has a side length of 10 units. What is its area?

4. A square has a side length of 3 units. What is the length of the diagonal?

5. A step has a height of 5 inches. A ramp starts 4 feet away from the base of the step, making a 5.9° angle with the ground. What can you say about the angle the ramp would make with the ground if the ramp starts farther away from the step?

      A. The angle would decrease

      B. The angle would remain the same

      C. The angle would increase

      D. We cannot determine anything about the angle