11.5 Do Now: Density & compound shapes

1. A lamp fixture is in the shape of a triangular pyramid. It is 7.2 inches tall and the area of its base is 11.5 in^2. Find the volume of the fixture to the *nearest cubic inch*.

2. A marble statue has a volume of 1135 in^3. Find its weight, to the *nearest tenth of a pound*. (assume the density of marble is 1.57 *ounces* per cubic inch)

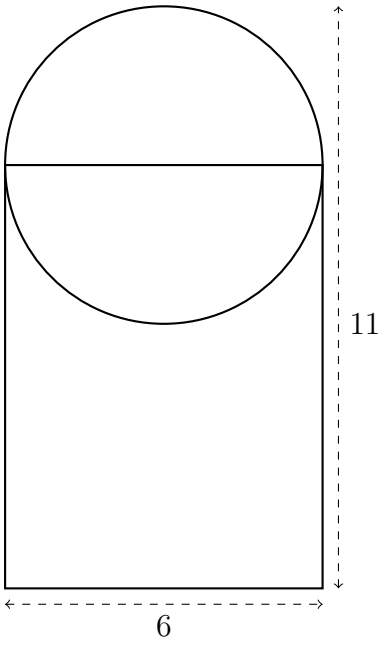
3. The area of the Bronx, NY is 42.47 square miles. Its population density is approximately 34,600 people per square mile. Estimate the population of the Bronx.

4. The volume of a cone is found to be 414.7 using the following formula:

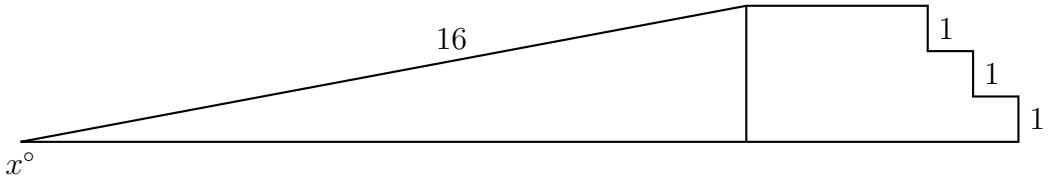
$$V = \frac{1}{3}\pi r^2 \times 11 = 414.7$$

What does the value 11 in the formula represent? Solve for the radius.

5. BECA middle schoolers draw a basketball key on the asphalt in chalk. It is rectangular with one end round. It is 6 feet wide and overall it is 11 feet long, as shown. Find the area of the chalked basketball key to the *nearest square foot*.



6. A wooden plank is laid on a brick platform. There are three steps leading to the platform, each 1 foot tall. The length of the plank is 16 feet. What is the angle of elevation, x, that the plank makes with the ground, to the *nearest degree*.



11.5 Pop Quiz: Density & compound shapes

1. A candle has the shape of a cone. It is 8.5 inches tall and the diameter of its base is 4 inches. Find the volume of the candle to the *nearest cubic inch*.

2. A bronz trophy has a volume of 520 cm^3. Find its weight, to the *nearest tenth of a kilogram*. (assume the density of bronz is 8.5 $grams/\text{cm}^3$)

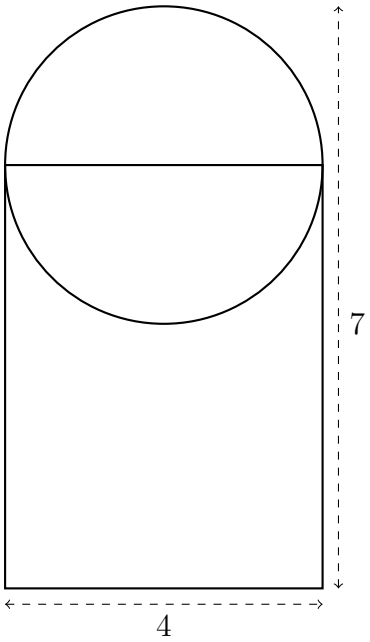
3. The area of the Manhattan, NY is 22.82 square miles. Its population density is approximately 73,000 people per square mile. Estimate the population of Manhattan.

4. The volume of a pyramid with a square base is found to be 245 using the formula:

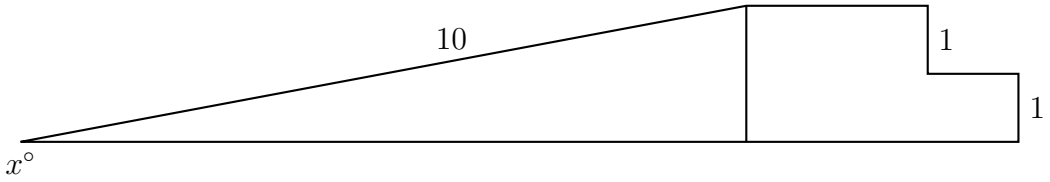
$$V = \frac{1}{3}x^2 \times 15 = 245$$

What does the value 15 in the formula represent? Solve for the length of the side of the square base.

5. Mott Hall fourth graders draw a basketball key on the asphalt in chalk. It is rectangular with one end round. It is 4 feet wide and overall it is 7 feet long, as shown. Find the area of the chalked basketball key to the *nearest square foot*.



6. A wooden plank is laid on a brick platform. There are two steps leading to the platform, each 1 foot tall. The length of the plank is 10 feet. What is the angle of elevation, x, that the plank makes with the ground, to the *nearest degree*.



11.5 Homework: Volume, density, trig, & compound shapes

1. A cube has a volume of 670 cubic inches. What is the length of its side, to the *nearest hundredth of an inch*?

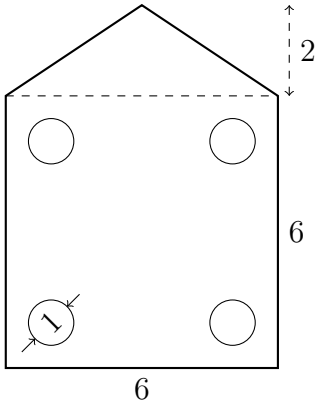
2. The Great Pyramid of Giza was constructed as a regular pyramid with a square base. It was built with an approximate volume of 2,592,276 cubic meters and a height of 146.5 meters. What was the length of one side of its base, to the *nearest meter*?

3. A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere.

   The bakery packages 8 of them into a box. If the density of the chocolate is 1.308 g/cm^3, determine and state, to the nearest gram, the total mass of the chocolate in the box.

4. A steel plate is shaped as a 6 inch square with a 2-inch tall triangle on one side, as shown. There are four circular holes in the plate, each having a 1 inch diameter. The plate is one quarter inch thick.

   (a) Determine and state the area taken up by the plate, subtracting the area of the holes, to the *nearest tenth of a square inch*.

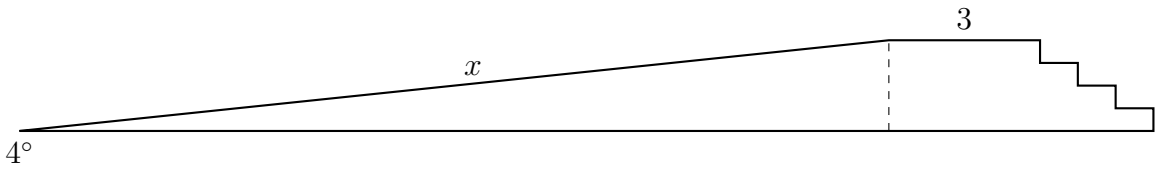


(b) Find the volume of the plate, to the *nearest tenth of a cubic inch*.

(c) Find the weight of the plate, to the *nearest ounce*.

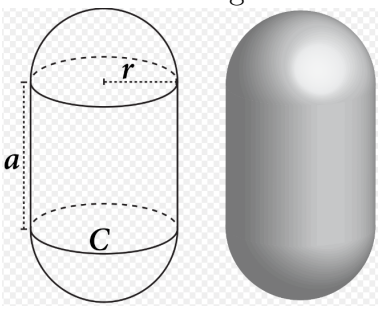
5. A concrete ramp with a 4° angle of elevation leads to a platform with a staircase stepping down from the opposite side, as shown below. The length of the platform is 3 feet, and each of the four steps has a rise of 7 inches and run of 10 inches. Find the length of the ramp x, to the *nearest inch*.

Not to Scale



6. A prescription medicine comes in capsule form. The capsule is in the shape of a cylinder with hemispherical ends, as shown in the rendering below. The capsule is 15 millimeters long by 8 millimeters across.

   (a) Write down the radius r of the capsule and the length of the cylindical portion a, shown in the diagram.



   (b) Find the volume of the capsule to the *nearest cubic millimeter*.