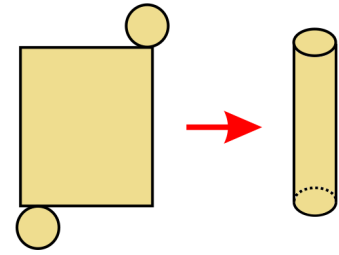


Surface Area

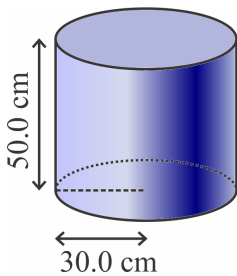
The **surface area** of a solid is the total area of all of its faces.

The **net** of a solid shows all the faces of the solid drawn in a plane, as if on a flat paper. It often makes calculating the surface area easier.

Example 1. The net of a cylinder consists of two circles for the bases and a rectangle for the lateral face (the face that “wraps around”).

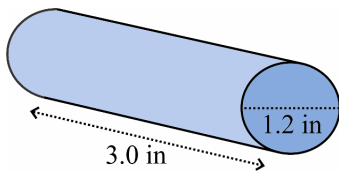


1. Sketch a net for each cylinder and calculate its surface area to the accuracy indicated.



a. _____ cm^2

Round your answer to the nearest hundred square centimeters (three significant digits).



b. _____ in^2

Round your answer to the nearest square inch (two significant digits).

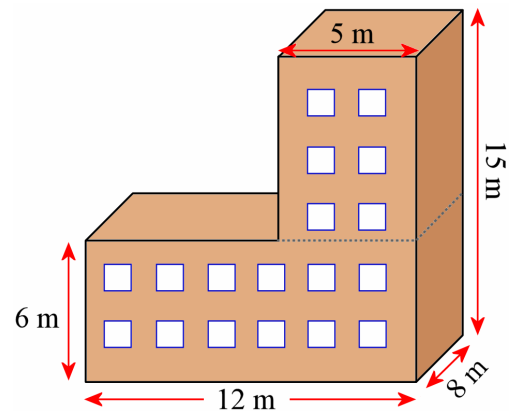
2. Jeannie made a pyramid out of paper for a decoration. The bottom of the pyramid was a square with 5.0-cm sides, and the height of each triangular face of the pyramid was 4.0 cm.

a. Sketch a net for Jeannie's pyramid.

b. Calculate the surface area of the pyramid.

c. (Optional). Make this pyramid from paper.

3. Find the surface area of this building (not including the bottom face).



4. The surface area of a cube is 150 cm^2 .
Calculate the volume of the cube.

5. One cube has edges 1 unit long, and another has edges 2 units long.
In other words, the lengths of their edges are in a ratio of 1:2.

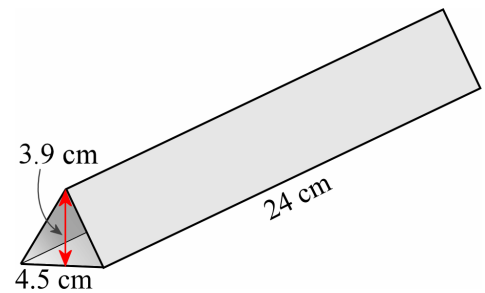
a. What is the ratio of their surface areas?

b. What is the ratio of their volumes?

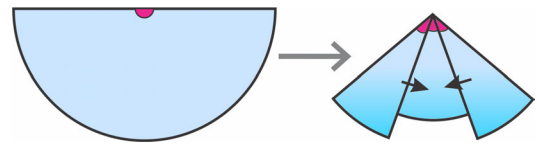
6. Three mirrors are set up in a form of an equilateral triangular prism.
They will go inside a tube to make a kaleidoscope.

a. Calculate the total surface area of the mirrors
(not the end triangles).
Round to the nearest ten square centimeters.

b. Calculate the volume of the triangular prism.
Round to the nearest ten cubic centimeters.



A half-circle can be folded into a cone. The folded part is called the **lateral face** of the cone: it is the face that “wraps around” the base. The base of a cone is a circle.

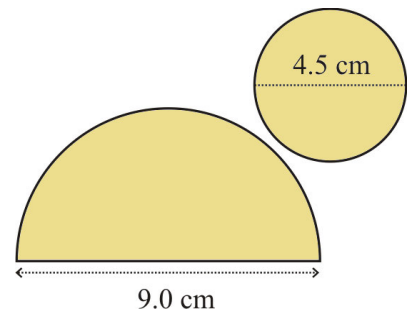


Example 2. Find the surface area of the cone with this net.

1. The bottom face is a circle with a radius of 2.25 cm.
Its area is $\pi r^2 = \pi \cdot (2.25 \text{ cm})^2 \approx 15.9043 \text{ cm}^2$.
2. The lateral face is a half circle, with a radius of 4.5 cm.
Its area is $(\frac{1}{2})\pi \cdot r^2 = 0.5 \cdot \pi \cdot (4.5 \text{ cm})^2 \approx 31.8086 \text{ cm}^2$.

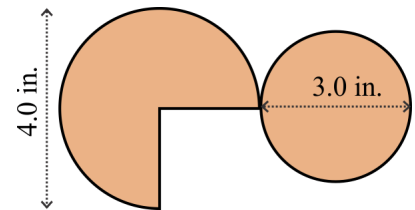
Lastly we add the two: $15.9043 \text{ cm}^2 + 31.8086 \text{ cm}^2 = 47.7129 \text{ cm}^2 \approx 48 \text{ cm}^2$.

Notice that we carried several more decimals in the intermediate calculations than we kept for the final answer. For best accuracy, don't round your intermediate results—round only the final answer.



7. **a.** Draw a half-circle with a radius of 7.5 cm on blank paper. Cut it out and fold it into a cone.
- b.** Calculate the surface area of your cone (without the base circle).

8. Find the surface area of this cone. Its lateral face is $\frac{3}{4}$ of a circle.



Puzzle Corner

Find the surface area of this figure.

