



Surface Area & Volume Stretch

This activity involves determining the surface area (SA) and volume (V) of various geometric solids. For the purposes of these exercises, all solids are assumed to be right (the height is perpendicular to the base at its center). Below is an example of each solid along with the formulas for determining its surface area and volume.

B = base area

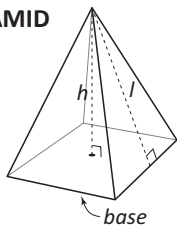
P = base perimeter

h = height

l = slant height

r = radius

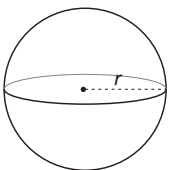
PYRAMID



$$SA = B + \frac{1}{2}Pl$$

$$V = \frac{1}{3}Bh$$

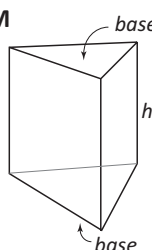
SPHERE



$$SA = 4\pi r^2$$

$$V = \frac{4}{3}\pi r^3$$

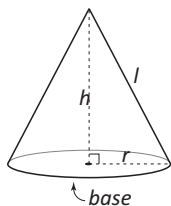
PRISM



$$SA = 2B + Ph$$

$$V = Bh$$

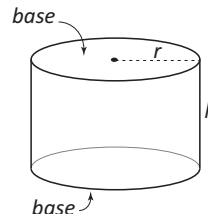
CONE: Pyramid with circular base



$$SA = \pi r^2 + \pi rl$$

$$V = \frac{1}{3}\pi r^2 h$$

CYLINDER: Prism with circular bases



$$SA = 2\pi r^2 + 2\pi rh$$

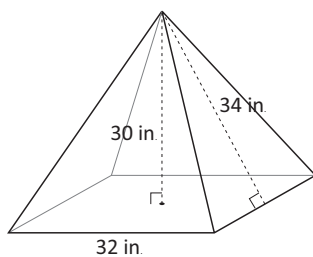
$$V = \pi r^2 h$$

For 271 and 272, find the surface area and volume of the geometric solid.

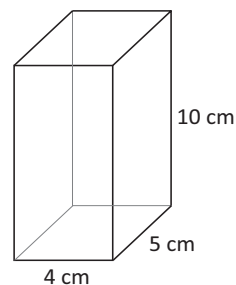
271. $SA =$ _____ in^2

$V =$ _____ in^3

271. square pyramid



272. rectangular prism



272. $SA =$ _____ cm^2

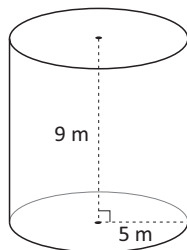
$V =$ _____ cm^3

For 273-275, find the surface area and volume of the geometric solid. Express your answer in terms of π .

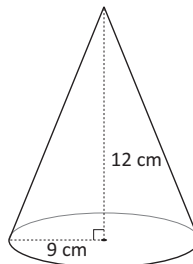
273. $SA =$ _____ m^2

$V =$ _____ m^3

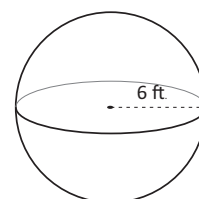
273. cylinder



274. cone



275. sphere



274. $SA =$ _____ cm^2

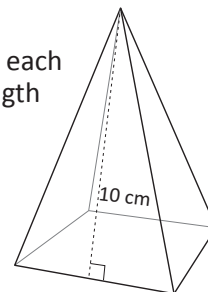
$V =$ _____ cm^3

275. $SA =$ _____ ft^2

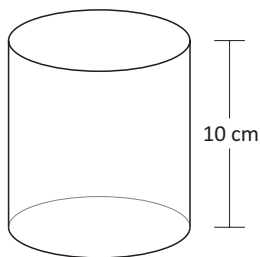
$V =$ _____ ft^3

276. _____ cm

A right square pyramid has lateral faces with slant heights that are each 10 cm. If the surface area of this pyramid is 96 cm^2 , what is the length of one of the edges of the base?

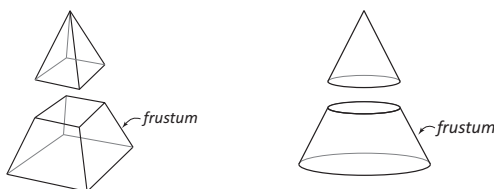


277. _____ cm^2

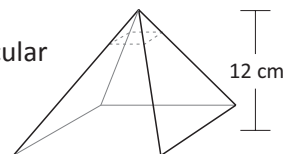


What is the surface area, in square centimeters, of a cylinder with volume $250\pi \text{ cm}^3$ and height 10 cm? Express your answer in terms of π .

The frustum of a cone or a pyramid is that part of the solid left when the top portion is cut off by a plane parallel to its base.



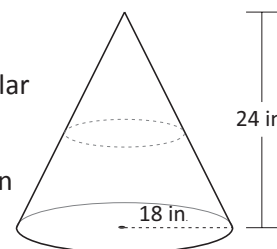
278. A pyramid with height 12 cm has a square base with area 64 cm^2 . A plane perpendicular to the height intersects the pyramid 3 cm from its apex.



a. _____ cm^3 What is the volume of the resulting frustum?

b. _____ cm^2 What is the surface area of the frustum? Express your answer in simplest radical form.

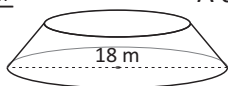
279. A cone with a height of 24 inches has a base with radius 18 inches. A plane perpendicular to the height intersects the cone halfway between its apex and base.



a. _____ in^3 What is the volume of the resulting frustum? Express your answer in terms of π .

b. _____ in^2 What is the surface area of the frustum? Express your answer in terms of π .

280. _____ m^3



A cone of height 9 m was cut parallel to its base at 3 m above its base. If the base of the original cone had diameter 18 m, what is the volume of the resulting frustum? Express your answer in terms of π .