

Round Solids: Cylinder, Cone, Sphere Volume

Grade 8 math · Worksheet · Standards: 8.G.C.9

Name: _____ Date: _____ Class: _____

These problems apply the volume formulas for cylinders, cones, and spheres from standard 8.G.C.9. Early problems substitute into a formula; later ones find a missing dimension and combine solids in tanks, silos, and piles.

Write the formula first, replace every diameter with a radius, and keep π in the answer unless 3.14 is requested.

Standards: 8.G.C.9 · **Level:** Grade 8

Problem 1 Cylinder in terms of pi (easy)

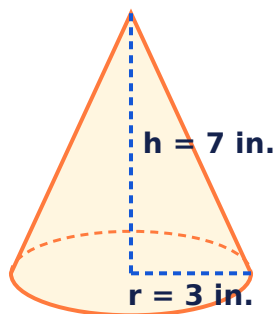
A cylindrical candle mold has a base radius of 4 cm and stands 10 cm tall. How much wax does it hold? Give the exact volume as an exact value with π .

Problem 2 Diameter given (easy)

A round cake pan measures 12 in. across and is 5 in. deep. Find its capacity as an exact value with π .

Problem 3 First cone (easy)

A paper cup is shaped like a cone with an opening of radius 3 in. and a depth of 7 in. Find the volume it holds as an exact value with π .



A cone-shaped paper cup.

Problem 4 Wider cone (easy)

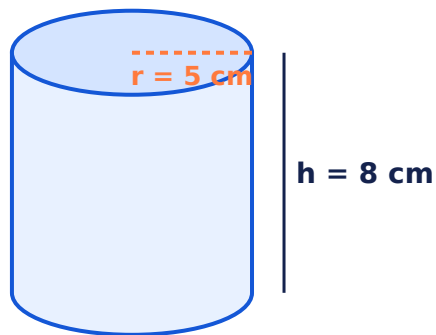
A solid model of a traffic cone has a base radius of 6 cm and height 9 cm. Calculate its volume as an exact value with π .

Problem 5 First sphere (easy)

A spherical balloon has radius 3 ft. Find the volume of air inside as an exact value with π .

Problem 6 Cylinder with 3.14 (medium)

Calculate how much the cylinder holds. Take π to be 3.14.



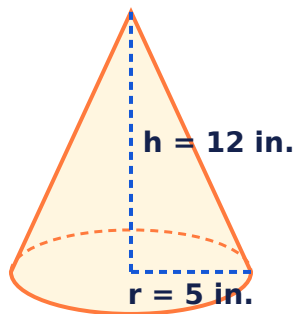
Cylinder with $r = 5 \text{ cm}$ and $h = 8 \text{ cm}$.

Problem 7 Big sphere (medium)

A sphere has diameter 18 cm. Calculate its volume as an exact value with π .

Problem 8 Cone with 3.14 (medium)

Calculate how much the cone holds. Take π to be 3.14.



Cone with $r = 5 \text{ in.}$ and $h = 12 \text{ in.}$

Problem 9 Sphere with 3.14 (medium)

A solid ball has radius 6 in. Calculate its volume taking π as 3.14.

Problem 10 Find the height of a cylinder (medium)

A cylinder has a volume of $225\pi \text{ cm}^3$ and radius 5 cm. Find its height.

Problem 11 Find the height of a cone (medium)

A cone has a volume of $96\pi \text{ cm}^3$ and radius 6 cm. Find its height.

Problem 12 Cone versus cylinder (medium)

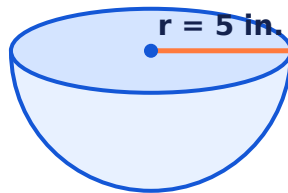
A cone has a volume of $40\pi \text{ in}^3$. A cylinder has the same radius and the same height. Calculate how much the cylinder holds.

Problem 13 Find the radius (hard)

A sphere has a volume of $(32/3)\pi$ cubic inches. Find its radius.

Problem 14 Hemisphere bowl (medium)

A bowl is a hemisphere with radius 5 in. Calculate its volume as an exact value with π , and rounded to one decimal place using the π key on a calculator.



A hemisphere bowl.

Problem 15 Water tank (medium)

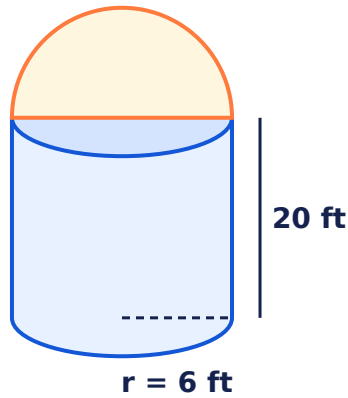
A cylindrical water tank has diameter 8 ft and height 10 ft. Take π to be 3.14 and find how many cubic feet of water it holds.

Problem 16 Ice cream cone (hard)

An ice cream cone has radius 3 cm and height 10 cm. It is filled with ice cream, and a hemisphere of ice cream with the same radius sits on top. Add up the total volume of ice cream as an exact value with π and with 3.14.

Problem 17 Grain silo (hard)

A grain silo is a cylinder of radius 6 ft and height 20 ft with a hemisphere of radius 6 ft on top. Find its total volume as an exact value with π and with 3.14.



A silo: a cylinder with a hemisphere on top.

Problem 18 Ball in a tube (hard)

A tennis ball with radius 3 in. fits exactly inside a cylindrical tube with the same radius and height 6 in. How much empty space is in the tube? Take π to be 3.14.

Problem 19 Sand pile (hard)

A conical pile of sand has diameter 12 ft and height 5 ft. A dump truck carries 40 ft^3 per load. Take π to be 3.14 and find how many loads are needed to move the whole pile.

Problem 20 Pouring water (hard)

A full conical cup has radius 6 cm and height 9 cm. Its water is poured into an empty cylinder with radius 4 cm. How high does the water rise in the cylinder?