

Geometry - Area, Volume and Dissection Arguments - Worksheet

Common Core G-GMD.A.1, G-GMD.A.3 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice circle area, volumes of prisms, cylinders, pyramids, cones and spheres, and Cavalieri's principle (Common Core G-GMD.A.1, G-GMD.A.3). The first problems are quick one-step checks of the definitions and formulas from the lesson. The middle problems ask for diagrams, equations and careful reasoning in the style of a high school Geometry class. The last six problems are applications with tanks, ice cream cones, silos and sand piles.

Geometry · Common Core State Standards: **G-GMD.A.1, G-GMD.A.3**

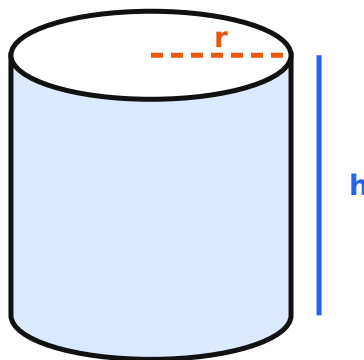
Exercise 1 - Circumference and area

Find the circumference and area of a circle with radius 7. Give exact answers.

Exercise 2 - Area from the diameter

A circle has diameter 10. Find its area to the nearest tenth.

Exercise 3 - Cylinder volume



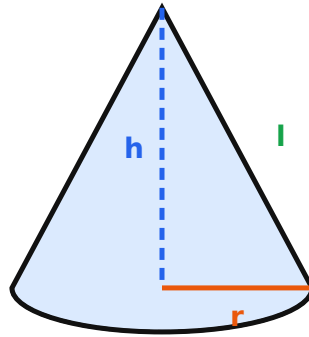
Cylinder: $V = \pi r^2 h$.

Find the volume of a cylinder with radius 3 and height 10. Give the exact value and a decimal to the nearest tenth.

Exercise 4 - Cylinder from the diameter

A can has diameter 8 inches and height 12 inches. Find its volume to the nearest tenth.

Exercise 5 - Cone volume



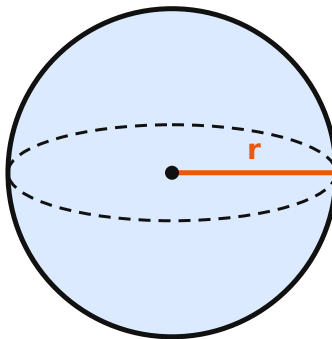
$$\text{Cone: } V = \frac{1}{3}\pi r^2 h.$$

Find the volume of a cone with radius 6 and height 9.

Exercise 6 - Cone with slant height

A cone has radius 5 and slant height 13. Find its height and its volume.

Exercise 7 - Sphere volume



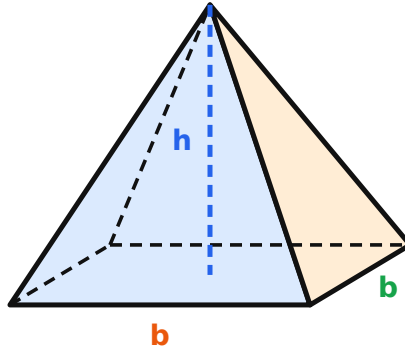
$$\text{Sphere: } V = \frac{4}{3}\pi r^3.$$

Find the volume of a sphere with radius 3.

Exercise 8 - Larger sphere

Find the volume of a sphere with radius 6 to the nearest tenth.

Exercise 9 - Square pyramid



$$\text{Pyramid: } V = \frac{1}{3}Bh.$$

A square pyramid has a base side of 8 and a height of 9. Find its volume.

Exercise 10 - Rectangular pyramid

A pyramid has a rectangular base 6 by 10 and height 7. Find the volume.

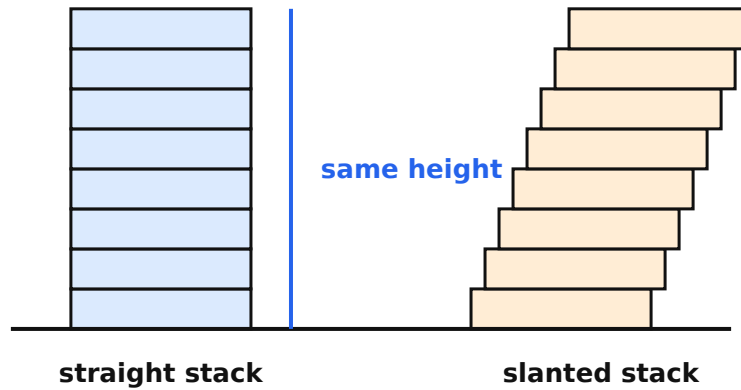
Exercise 11 - Hemisphere

Find the volume of a hemisphere with radius 6 to the nearest tenth.

Exercise 12 - Find the radius

A cylinder has volume 200π and height 8. Find its radius.

Exercise 13 - Cavalieri



Cavalieri's principle: equal heights and equal cross-sections give equal volumes.

A right prism has base area 40 and height 9. A slanted prism has the same base area, the same height, and equal cross-sectional areas at every level. Find the volume of each and explain.

Exercise 14 - Cone and cylinder

A cylinder and a cone have the same radius and height. The cylinder has volume 150π . Find the volume of the cone.

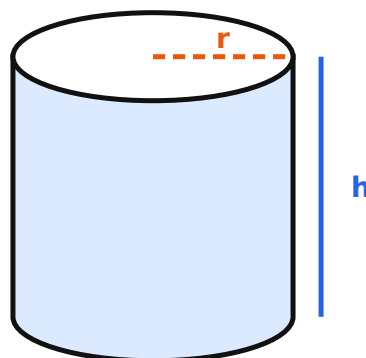
Exercise 15 - Pyramid in a cube

A cube has side 6. A pyramid inside it has a face of the cube as its base and the opposite vertex as its apex. Find the volume of the cube and of the pyramid, and say how many such pyramids fill the cube.

Exercise 16 - Doubling the radius

A sphere's radius doubles. By what factor does its volume change? Check with radii 2 and 4.

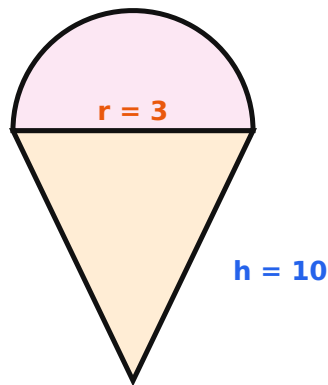
Exercise 17 - Water tank



Cylinder: $V = \pi r^2 h$.

A cylindrical water tank has radius 4 feet and height 10 feet. Find its volume in cubic feet, and the number of gallons it holds (1 cubic foot is about 7.48 gallons), to the nearest whole number.

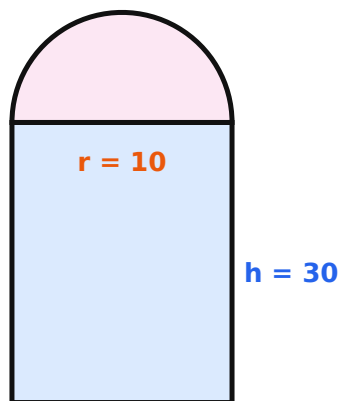
Exercise 18 - Ice cream cone



Cone with a scoop.

An ice cream cone has radius 3 cm and height 10 cm. A scoop shaped like a hemisphere of radius 3 cm sits on top. Find the total volume to the nearest tenth.

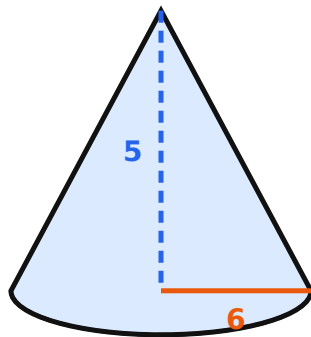
Exercise 19 - Grain silo



Silo.

A grain silo is a cylinder of radius 10 feet and height 30 feet with a hemisphere on top. Find its total volume to the nearest cubic foot.

Exercise 20 - Sand pile



Pile of sand.

A pile of sand is a cone with diameter 12 feet and height 5 feet. Find its volume to the nearest tenth of a cubic foot.