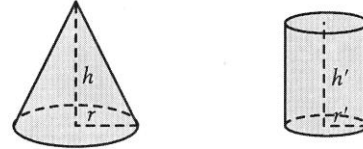


1. A prism with a height of 4 cm has a rectangular base with dimensions 6 cm by 9 cm. What is the measure of a cube's edge that is equivalent to the prism? 6 cm

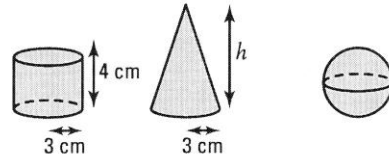
2. A cone and a cylinder are equivalent. The radius and the height of the cone measure 6 cm and 10 cm respectively. What is the height of the cylinder if its radius measures 5 cm?
4.8 cm



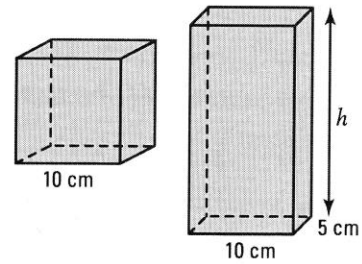
3. The cylinder, cone and sphere on the right are equivalent. Determine

a) the height h of the cone; $h = 12 \text{ cm}$

b) the radius r of the sphere. $r = 3 \text{ cm}$



4. The cube and the rectangular prism on the right are equivalent. If the cube has 10 cm edges and the base of the prism is a 5 cm by 10 cm rectangle, find the height h of the prism.



$$10 \times 5 \times h = 10^3 \Rightarrow h = 20 \text{ cm}$$

5. a) A cylinder and a cone with the same height of 6 cm are equivalent. Determine the radius r of the cone if the cylinder's radius measures 3 cm.

$$\pi \cdot 3^2 \cdot 6 = \frac{\pi \cdot r^2 \cdot 6}{3} \Rightarrow r = 3\sqrt{3} \text{ cm}$$

- b) A cylinder and a cone with the same radius of 3 cm are equivalent. Determine the height h of the cone if the cylinder's height measures 6 cm.

$$\pi \cdot 3^2 \cdot 6 = \frac{\pi \cdot 3^2 h}{3} \Rightarrow h = 18 \text{ cm}$$

6. A sphere, a cylinder and a cone are equivalent and each have a radius of 3 cm. Calculate

a) the height of the cylinder; $h = 4 \text{ cm}$

b) the height of the cone. $h = 12 \text{ cm}$

7. A cone and a cylinder have the same height h and are equivalent. Let r represent the radius of the cylinder. What is the radius of the cone?

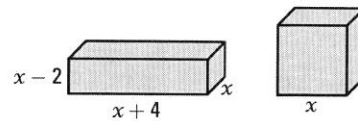
radius of cone: $r\sqrt{3}$

8. The rectangular prism and the cube on the right are equivalent. By how much does the total area of the prism surpass the total area of the cube?

$$x(x+4)(x-2) = x^3; x = 4.$$

$$\text{Area of prism} = 112 \text{ u}^2; \text{Area of cube} = 96 \text{ u}^2$$

The area of the prism is 16 u^2 more than the cube.



9. A prism, a cylinder and a cone are equivalent. If the bases of the prism, the cylinder and the cone are equivalent, compare

a) the heights of the prism and the cylinder; **They are equal.**

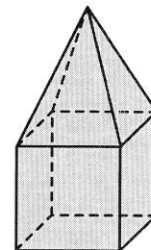
b) the heights of the prism and the cone. **The height of the cone is the triple of the prism's height.**

10. A sculpture is formed by a pyramid mounted on top of a cube. The cube and the pyramid are equivalent. Determine the total height of the sculpture if its volume is equal to 432 cm^3 .

$$\text{Volume of cube} = 216 \text{ cm}^3 \Rightarrow \text{height of cube} = 6 \text{ cm}$$

$$\text{Volume of pyramid} = 216 = \frac{6^2 \cdot h}{3} \Rightarrow \text{height of pyramid} = 18 \text{ cm}$$

$$\text{Total height of sculpture} = 24 \text{ cm}$$



11. A cylinder and a sphere have the same radius and are equivalent.

a) Express the height h of the cylinder as a function of the radius r .

$$h: \text{height of cylinder}; \pi r^2 h = \frac{4}{3} \pi r^3 \Rightarrow h = \frac{4}{3} r$$

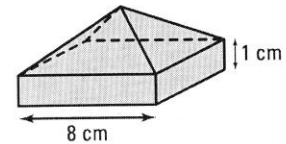
b) Express as a function of r how much the total area of the cylinder surpasses the area of the sphere.

$$\text{Total area of cylinder} = 2\pi r^2 + 2\pi r \cdot \frac{4}{3} r = \frac{14}{3} \pi r^2; \text{Area of sphere } 4\pi r^2.$$

The total area of the cylinder is $\frac{2}{3}\pi r^2$ greater than the area of the sphere.

c) Determine the difference between these two areas when $r = 3$ cm. $6\pi \text{ cm}^2$

12. A sculpture is formed by a square based pyramid mounted on top of a prism. The pyramid and the prism are equivalent. Calculate the total area of the sculpture.



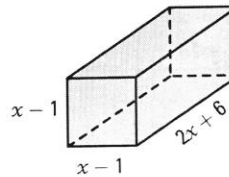
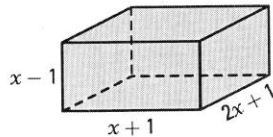
$$\text{Volume of prism} = \text{volume of pyramid} = 64 \text{ cm}^3$$

$$\text{Height of pyramid} = 3 \text{ cm. Slant height of pyramid} = 5 \text{ cm.}$$

$$\text{Lateral area of pyramid} = 80 \text{ cm}^2; \text{Lateral area of prism} = 32 \text{ cm}^2$$

$$\text{Area of prism's base} = 64 \text{ cm}^2; \text{Total area of sculpture} = 176 \text{ cm}^2$$

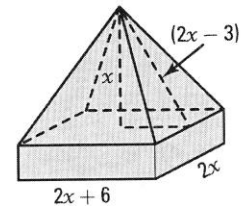
13. The right rectangular prism and square based prism below are equivalent. What is the numerical value of the sum of the volumes of these two prisms?



$$(x+1)(x-1)(2x+1) = (x-1)^2(2x+6); x = 7$$

$$\text{Volume of each prism} = 720 \text{ cm}^3; \text{Sum of volumes} = 1440 \text{ cm}^3$$

14. A solid is formed by a pyramid mounted on top of a rectangular prism. The pyramid and prism are equivalent. Let x represent the height of the pyramid and $(2x - 3)$ its slant height. The dimensions of the prism's base are $2x$ and $(2x + 6)$. What is the numerical value of this solid's total volume?



$$\text{We have: } (2x-3)^2 = x^2 + (x+3)^2; x = 9 \text{ u.}$$

$$\text{Volume of pyramid} = 24 \times 18 \times 9 \div 3 = 1296 \text{ cm}^3$$

$$\text{Total volume} = 2592 \text{ cm}^3$$