Solving for a dimension...

Sometimes you will be given the volume or the surface area of a 3-D object and you will be asked to solve (do opposite operations to both sides) to determine the dimensions.

Examples

1. A box of crackers has a volume of 5000 cm$^3$. If its length is 25 cm and its width is 8 cm, what is its height?

   \[ V = lwh \]
   \[ 5000 = 25 \times 8 \times h \]
   \[ \frac{5000}{200} = \frac{200h}{200} \]
   \[ 25 = h \text{ cm} \]

2. If the lateral surface area of a cone is 120 cm$^2$ and its slant height is 13 cm, determine its radius, to the nearest tenth of a centimeter.

   \[ S_{\text{LAT}} = \pi r s \]
   \[ \frac{120}{12} = \frac{\pi r (13)}{13} \]
   \[ 10.23 = \pi r \]

3. Determine the radius of a sphere with a volume of 500 cm$^3$ to the nearest tenth.

   \[ V = \frac{4}{3} \pi r^3 \]
   \[ \sqrt[3]{\frac{1500}{4}} = \sqrt[3]{\frac{4\pi r^3}{4}} \]
   \[ 3.75 = \pi r^3 \]
   \[ \frac{3.75}{\pi} = r^3 \]
   \[ \sqrt[3]{3.75} = r \]
   \[ 4.9 \text{ cm} = r \]

4. A sphere has a surface area of 47.5 cm$^2$. Determine its radius to one decimal place.

   \[ S_A = 4\pi r^2 \]
   \[ \frac{47.5}{4} = \frac{4\pi r^2}{4} \]
   \[ \frac{11.875}{\pi} = r^2 \]
   \[ \sqrt{11.875} = \pi r^2 \]
   \[ 1.8 \text{ cm} = r \]