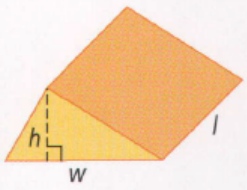
Solutions

1. Consider this triangular prism.
h is the height of the triangular base
w is the width of the base
l is the length (or height) of the prism



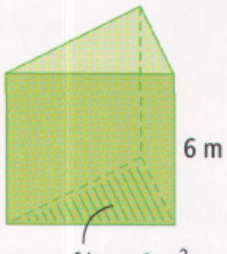
a) What is the area of one base of the triangular prism?
b) What is the formula for the volume of the triangular prism in terms of h, w, and l?

a) Area of base $= \frac{1}{2} \times w \times h$

b) Volume $= \frac{1}{2} \times w \times h \times l$

2. Find the volume of each triangular prism.

a)



b)

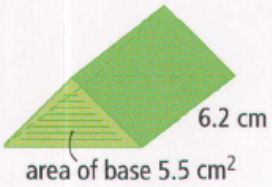
Vol = Base Area × Height

a) Vol = 9 × 6
= 54 m³

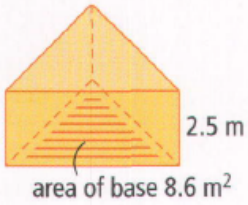
b) Vol = 4 × 5
= 20 cm³

3. Find the volume of each triangular prism.

a)



b)

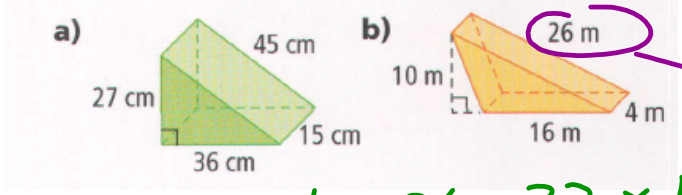


Vol = Base Area × Height [length]

a) Vol = 5.5 × 6.2
= 34.1 cm³

b) Vol = 8.6 × 2.5
= 21.5 m³

4. Calculate the volume of each triangular prism.



$Vol = \frac{1}{2} \times w \times h \times l$

not needed for volume calculations.

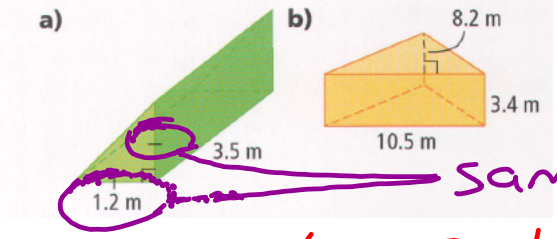
a) $Vol = \frac{1}{2} \times 36 \times 27 \times 15$

$= 7290\ cm^3$

b) $Vol = \frac{1}{2} \times 16 \times 10 \times 4$

$= 320 m^3$

5. Calculate the volume of each triangular prism. Round your answers to the nearest tenth.



same distance (1.2m)

a) $Vol = \frac{1}{2} \times 1.2 \times 1.2 \times 3.5$

$= 2.52 m^3$

b) $Vol = \frac{1}{2} \times 10.5 \times 3.4 \times 8.2$

$= 146.37 m^3$

6. A triangular prism has a volume of 100 cm^3 and a height of 20 cm. What is the area of one of its bases?

$$\text{Vol} = \text{Base Area} \times \text{Height}$$

$$\frac{100}{20} = \frac{x \times 20}{20}$$

$$5 = x$$

$$\Rightarrow \text{Base area} = 5\,cm^2$$

7. A triangular prism can hold 2 L of water. If the area of one of its bases is 250 cm^2, what is the height of the prism?

$1\,\text{Litre} = 1000\,cm^3$

$$\text{Vol} = \text{Base Area} \times \text{Height}$$

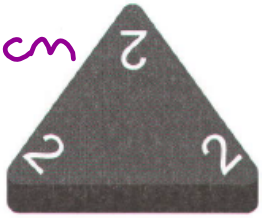
$$\frac{2000}{250} = \frac{250 \times y}{250}$$

$$8 = y$$

$$\Rightarrow \text{Height of prism} = 8\,cm^3$$

8. Each triangular tile in a board game has a thickness of 8 mm. What is the volume of one tile if the area of its base is 3.5 cm^2?

$8mm = 0.8cm$



$Vol = \text{Base Area} \times \text{Height}$

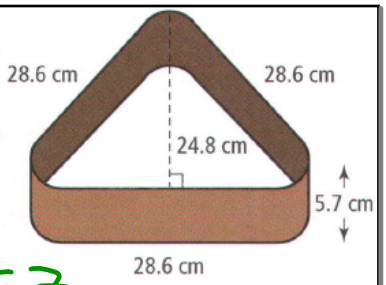
$= 3.5 \times 0.8$

$= 2.8\ cm^3$

9. A standard pool table comes with a triangular rack to hold the 15 billiard balls. The rack has three equal sides, each 28.6 cm long. It is 5.7 cm deep. The shortest distance from the tip of the triangle to the opposite side is 24.8 cm.

a) What is the amount of space (volume) within the rack? Round your answer to the nearest cubic centimetre.

b) The 15 billiard balls fit exactly into the rack. What is the approximate diameter of each ball? What do you notice about the answer? Hint: Draw a diagram to see how many balls fit on each side of the rack.



a) $Vol = \frac{1}{2} \times 28.6 \times 24.8 \times 5.7$

$= 2021.448$

$= 2021\ cm^3$

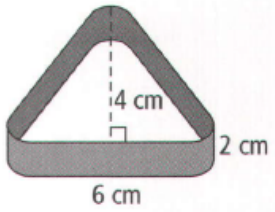
b) 5 balls fit on each side

$\Rightarrow$ Diameter $= 28.6 \div 5$

$= 5.72\ cm$

The answer is the same as the height of the rack!

10. Mel kneaded a lump of dough into a ball with a volume of 2000 cm^3. How many cookies can she make with this cookie cutter? What assumption(s) do you need to make?



Vol of cutter $= \frac{1}{2} \times 6 \times 4 \times 2$

$= 24 cm^3$

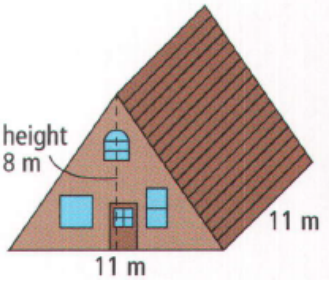
cookies $= \frac{2000}{24}$

$= 83.\overline{3}$

$\Rightarrow$ can make 83 cookies

Assume that the measurements are INTERNAL and not EXTERNAL

11. The Patels own an A-frame cottage and want to install air conditioning. One air-conditioning unit says it will cool up to 500 m^3. Will one of these units be enough to cool the cottage? Justify your answer.



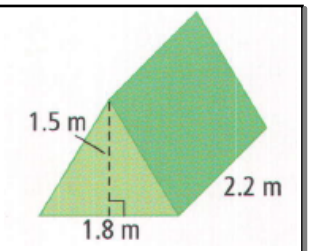
Vol of cottage $= \frac{1}{2} \times 11 \times 8 \times 11$

$= 484 m^3$

$\Rightarrow$ Yes, one unit will be enough for this cottage

12. Jimmy is preparing for a camping trip with two of his friends. He is not sure if there will be enough room for the three of them in his tent.

a) How much space is there inside the tent?
b) Will this be enough room for the three of them to fit comfortably? Give reasons for your answer.



a) Vol of tent $= \frac{1}{2} \times 1.8 \times 1.5 \times 2.2$
$= 2.97 m^3$

b) Unlikely! This means that each person has less than $1 m^3$.