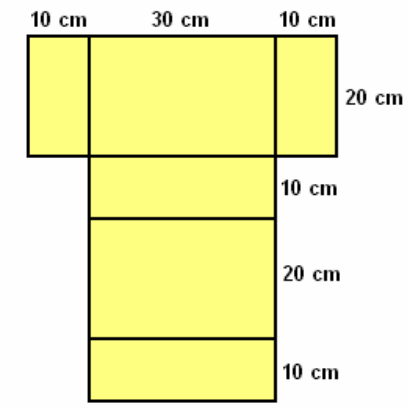
Get Ready for Grade 9 Surface Area and Volume Worked Examples and Practice

Example 1: A cereal box measures 30 cm by 20 cm by 10 cm. Show a net that can be used to make the box.



Solution: Several nets are possible. One of them is shown.

Example 2: Find the surface area of the box in Example 1.

Solution: Use the formula for the surface area of a box, or rectangular prism. The length is 30 cm, the width is 20 cm, and the height is 10 cm.

$$\begin{aligned} S &= 2lw + 2wh + 2lh \\ &= 2(30 \times 20) + 2(20 \times 10) + 2(30 \times 10) \\ &= 2200 \text{ cm}^2 \end{aligned}$$

The surface area is 2200 cm^2.

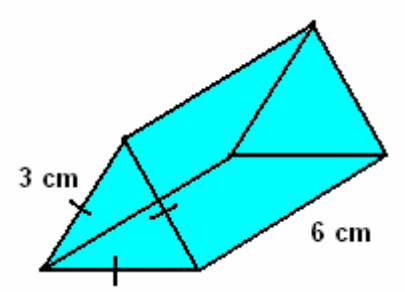
Example 3: Find the volume of the box in Example 1.

Solution: Use the formula for the volume of a box.

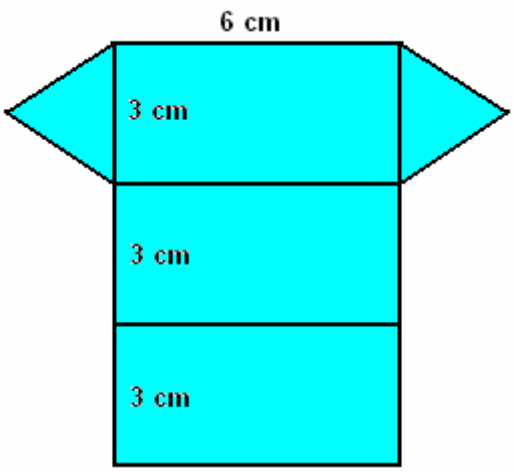
$$\begin{aligned} V &= lwh \\ &= 30 \times 20 \times 10 \\ &= 6000 \text{ cm}^3 \end{aligned}$$

The volume is 6000 cm^3.

Example 4: A triangular prism for use in a camera is shown. Draw a net that can be used to make a model of the prism.

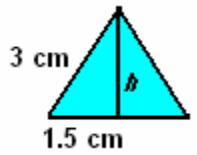


Solution: Several nets are possible. One of them is shown.



Example 5: Find the surface area and volume of the triangular prism in Example 4.

Solution: You will need to calculate the area of the triangular end of the prism. Use the Pythagorean theorem to find the height.



$$h^2 = 3^2 - 1.5^2$$
$$= 6.75$$
$$h = 2.6 \text{ cm}$$

The area of the triangle is calculated:

$$A = \frac{1}{2}bh$$
$$= \frac{1}{2} \times (3) \times (2.6)$$
$$= 3.9 \text{ cm}^2$$

The surface area of the prism is twice the area of the triangle plus three times the area of one side.

$$S = 2 \times (3.9) + 3 \times (3) \times (6)$$
$$= 61.8 \text{ cm}^2$$

The surface area is 61.8 cm^2.

The volume of the prism is given by the area of the triangle multiplied by the length.

$$V = 3.9 \times 6$$
$$= 23.4 \text{ cm}^3$$

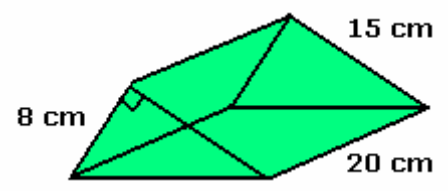
The volume is 23.4 cm^3.

Practice:

1. A sand box measures 1.5 m by 1.8 m by 0.25 m. Sketch a net to represent the sand box.

2. Find the surface area and volume of the sand box in question 1.

3. A triangular prism is shown. Sketch a net to represent the prism.



4. Find the surface area and volume of the prism in question 3.

Answers:

2. $S = 7.05\ m^2$, $V = 0.675\ m^3$

4. $S = 920\ cm^2$, $V = 1200\ cm^3$