

## **Grade 9**

### **WEEK 8**

#### **Lesson # 2**

**Topic:** Measurement

**Sub-Topic:** Volume and Surface Area of solids

#### **Objective:**

Students will:

- ✓ Calculate the volume for solids with little difficulty;

#### **Content:**

Remember:

Volume of right solids is  $A \times H$ , meaning area of cross section  $\times$  height or length.

If the shape has a circle at the bottom like a cylinder, then apply the formula for a circle and multiply it by the height of the cylinder.

Exercise:

1. (a) How many lead cubes of side 5 mm could be made from a rectangular block of lead measuring 10 cm by 5 cm by 4 cm?

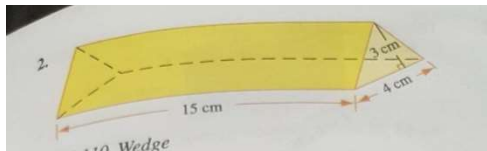


Fig. 4.110 Wedge

- (a) Calculate the volume of the wedge shown with the given measurements in the diagram above.
  - (b) The wedge is made of nickel of density  $8.90 \text{ g cm}^{-3}$ . Determine the mass of the wedge in grams.
3. A prism of length 12 cm has a right-angled triangular end with edges 3 cm, 4 cm and 5 cm.

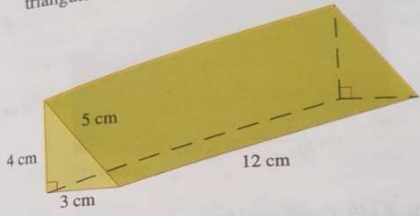


Fig. 4.111 Prism

- (a) Determine the total surface area of the prism.
- (b) Calculate the volume of the prism.

4.

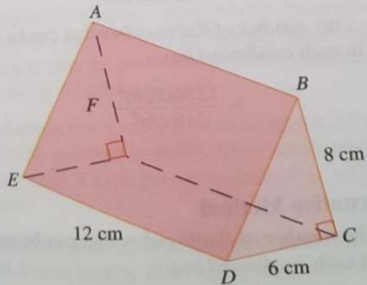


Fig. 4.112 Prism

For the prism above, calculate:

- (a) the length, in cm, of  $BD$
- (b) the surface area, in  $\text{cm}^2$ , of the prism
- (c) the volume, in  $\text{cm}^3$ , of the prism.

5.

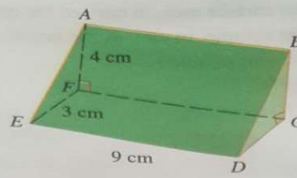


Fig. 4.113 Prism

The figure  $ABCDEF$  above represents a prism with measurements as shown.  $BC$  is perpendicular to the plane  $FEDC$ . Calculate:

- (a) the length, in cm, of  $BD$
- (b) the surface area, in  $\text{cm}^2$ , of the prism
- (c) the volume, in  $\text{cm}^3$ , of the prism
- (d) the size of angle  $DBC$ .

6.

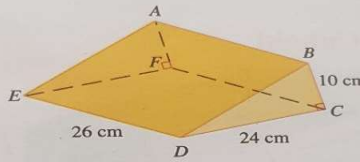


Fig. 4.114 Wedge

The figure  $ABCDEF$  above represents a wedge with measurements as shown.  $BC$  is perpendicular to the plane  $FEDC$ . Calculate:

- (a) the length, in cm, of  $BD$
- (b) the surface area, in  $\text{cm}^2$ , of the wedge
- (c) the volume, in  $\text{cm}^3$ , of the wedge
- (d) the size of angle  $BDC$ .

7.

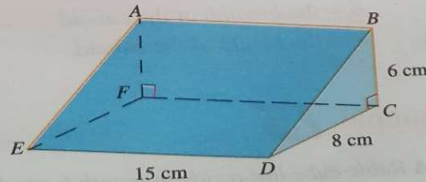


Fig. 4.115 Prism

The figure  $ABCDEF$  above represents a prism with measurements as shown.  $BC$  is perpendicular to the plane  $FEDC$ . Calculate:

- (a) the length, in cm, of  $BD$

space?

8. A classroom is 12 m in length, 8 m in width and 4 m in height. How many pupils can it hold if each pupil requires  $8 \text{ m}^3$  of air space?
9. How many cubic metres of water are required to fill a rectangular swimming pool 18 m long and 12 m wide which is 2 m deep throughout? How many litres of water can it hold?
10. How many lead cubes of side 3 cm could be made from a lead cube of side 27 cm?
11. How many lead cubes of side 5 mm can be made from a rectangular block of lead measuring 20 cm by 10 cm by 8 cm?

## Reference:

Raymond Toolsie (1996) Mathematics a Complete Course with CXC Question Volume 1 pages 137 - 143

Solution:

1. 1600 cubes

2. (a)  $V = 90 \text{ cm}^3$  (b)  $m = 801$

3. (a) T.S.A. =  $156 \text{ cm}^2$

(b)  $V = 72 \text{ cm}^3$

4. (a)  $BD = 10 \text{ cm}$

(b) T.S.A. =  $336 \text{ cm}^2$

(c)  $V = 288 \text{ cm}^3$

5. (a)  $BD = 5 \text{ cm}$

(b) T.S.A. =  $120 \text{ cm}^2$

(c)  $V = 54 \text{ cm}^3$

(d)  $DBC = 36.9^\circ$

6. (a)  $BD = 26 \text{ cm}$

(b) T.S.A. =  $1800 \text{ cm}^2$

(c)  $V = 3120 \text{ cm}^3$

(d)  $BDC = 22.6^\circ$

7. (a)  $BD = 10 \text{ cm}$

(b) T.S.A. =  $408 \text{ cm}^2$

(c)  $V = 360 \text{ cm}^3$

(d)  $DBC = 53.1^\circ$

8. 48 pupils

9.  $V = 432 \text{ cm}^3 / 4320001$

10. 729 cubes

11. 12800cubes.