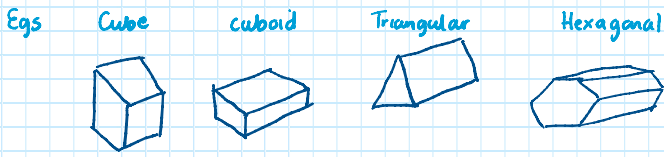


A prism is a solid object which has the same cross section all along its length



Log tables

Pg 11

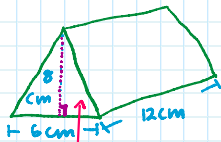
Solid of uniform cross-section (Prism)

$$V = Bh$$

B is the area of the base.

The volume of any solid of height (h) and uniform cross section is given by $V = Bh$

Eg 1) The triangular prism is shown in the diagram



Cross section
"face of the prism"

Find

1) The area of the triangular cross section

2) The volume of the prism?

Solution

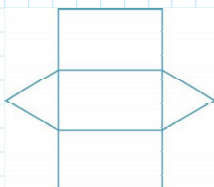
1) \triangle ^{triangle} cross section

$$\text{Area} = \frac{1}{2} \text{base} \times \perp \text{height}$$
$$\frac{1}{2} (6) \times 8 = 24 \text{cm}^2$$

2) Use the formula $V = Ah$
A = area of the cross section
h = length

$$V = 24 \times 12 = 288 \text{cm}^3$$

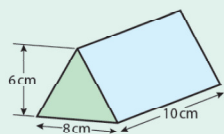
Net of a prism



Section 6.5 Prisms

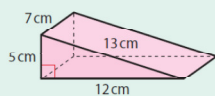
Example 1

Find the area of the triangular cross-section of this prism.
Hence find the volume of the prism.



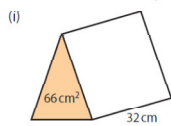
Example 2

Find the total surface area of this triangular prism by using its net.

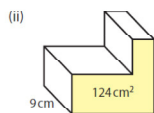


Exercise 6.5

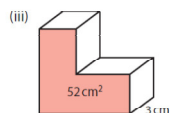
1. The areas of the cross-sections of these prisms are given. Find the volume of each prism.



$$66 \times 32 = 2112 \text{ cm}^3$$

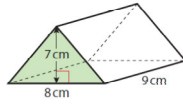


$$9 \times 124 = 1116 \text{ cm}^3$$



$$52 \times 3 = 156 \text{ cm}^3$$

2. (i) What is the area of the cross-section of this triangular prism?
 (ii) What is the volume of the prism?



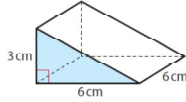
$$\frac{1}{2} B h$$

$$\frac{1}{2} (8)(7)$$

$$= 28 \text{ cm}^2$$

Volume
 Area Δ \times length
 $28 \times 9 = 252 \text{ cm}^3$

3. The cross-section of this prism is a right-angled triangle.
 Work out the volume of this prism.

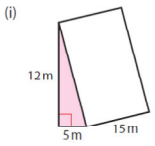


$$\frac{1}{2} (6)(3)$$

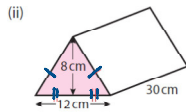
$$3(3) = 9 \text{ cm}^2$$

Volume $9 \times 6 = 54 \text{ cm}^3$

4. Work out the volume of each of these prisms:

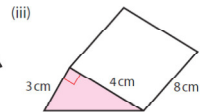


$$36 \times 15 = 450 \text{ cm}^3$$



$$48 \text{ cm}^2 \times 30$$

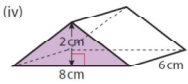
$$= 1440$$



$$2 \times 3 = 6$$

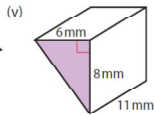
$$6 \times 8 = 48 \text{ cm}^3$$

4. Work out the volume of each of these prisms:



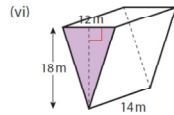
$$2 \times 4 = 8$$

$$8 \times 6 = 48 \text{ cm}^3$$



$$3 \times 8 = 24$$

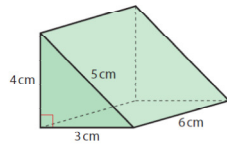
$$24 \times 11 = 264 \text{ mm}^3$$



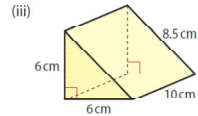
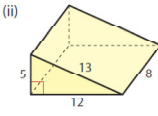
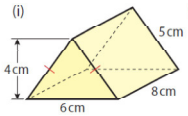
$$6 \times 18 = 108$$

$$104 \times 14 = 1512 \text{ m}$$

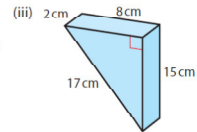
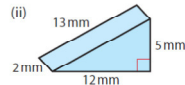
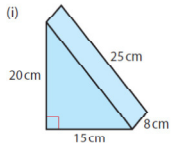
5. (i) How many faces has this prism?
 (ii) How many faces are triangular in shape?
 (iii) Work out the total surface area of the prism.



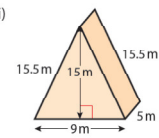
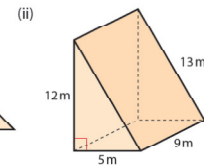
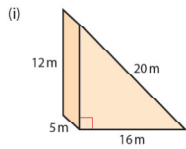
6. Find the total surface area of each of these prisms.



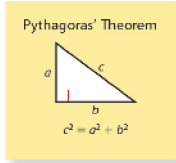
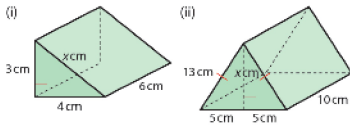
7. Find the total surface areas of these prisms:



8. Find (a) the volume (b) the surface area of each of these prisms:

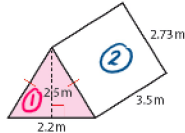


9. In each of the following questions, use Pythagoras' Theorem to calculate the unknown length, x , and then calculate the surface area.



10. Caroline manufactures tents, as shown on the right.

- (i) Find the surface area of the tent, including the floor.
- (ii) Caroline buys material at €20 per square metre. How much does it cost Caroline for the material to make a tent? Give your answer correct to the nearest €10.



1) $\Delta \textcircled{1} \frac{1}{2} B \times h = \frac{1}{2} (2.2) \times 2.5 = 2.75$
 $\frac{x^2}{5.5 m^2}$

2) $32.31 \times 20 = € 646.20$

$\textcircled{2} \text{ sides} \Rightarrow 2.2 \times 3.5 = 7.7$
 $\frac{x^2}{19.11 cm^2}$

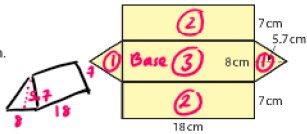
Floor $\Rightarrow 2.2 \times 2.2 = 4.84$

Total = $5.5 + 19.11 + 7.7 = 32.31 cm^2$

11. This is the net of a triangular prism.

- Find (i) the volume of the prism
- (ii) the surface area of the prism.

Area Cross section \times height



Volume

$\textcircled{1} \Delta = \frac{1}{2} (8) \times 7 = 28$ Area of cross section
 $\frac{x 18}{410.4 cm^3}$

Surface Area

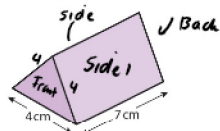
$\textcircled{1} \Delta \text{ Area} = 28 \times 2 = 56 cm^2$
 $\textcircled{2} \text{ sides} = \frac{18}{7} \times 7 = 18 \times 7 = 126 \times 2 = 252 cm^2$
 $\textcircled{3} \text{ Base} = 18 \times 8 = 144$

Total = $56 + 252 + 144 = 452 cm^2$

12. This is a triangular prism.

The ends of the prism are equilateral triangles.

- (i) Draw a rectangle 7 cm by 4 cm in the middle of a sheet of paper.
- (ii) Use this rectangle to complete an accurate net for this prism.



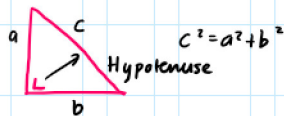
1) Volume: Area of cross section \times height

Area $\Delta =$



2) Surface Area

Pythagoras



Eg 1) Find the length of the missing side

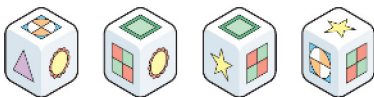
Δ with sides 4, 3, and hypotenuse $x=5$
 $x^2 = 4^2 + 3^2$
 $x^2 = 16 + 9$
 $x^2 = 25$
 $x = \sqrt{25} = 5$

Eg 2) Find x

Δ with sides 8, 6, and hypotenuse x
 $c^2 = a^2 + b^2$
 $x^2 = 8^2 + 6^2$
 $x^2 = 64 + 36$

New book Pg 498
 Old Chapter 22 Section 22.1
 Q 3, 4 (i) (iii) (v)

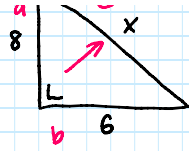
13. Here are four pictures of the same cube.



Which shapes are opposite each other?



Which shapes are opposite each other?



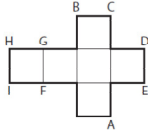
$$x^2 = 8^2 + 6^2$$

$$x^2 = 64 + 36$$

$$x^2 = 100$$

$$x = 10$$

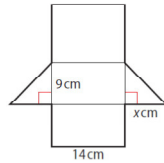
14. This is the net of a cube.



When the net is folded to make a cube, which two other vertices meet at A?

15. This is the net of a 3-D object.

- (i) When this net is folded, describe the figure it will make.
- (ii) If the volume of the figure is 378 cm^3 , find the value of x .



Answers

Exercise 6.5

1. (i) 2112 cm^3 (ii) 116 cm^3 (iii) 156 cm^3
2. (i) 28 cm^2 (ii) 252 cm^2
3. 54 cm^3
4. (i) 450 m^3 (ii) 1440 cm^3 (iii) 48 cm^3
(iv) 48 cm^3 (v) 264 mm^3 (vi) 1512 m^3
5. (i) 5 (ii) 2 (iii) 84 cm^2
6. (i) 152 cm^2 (ii) 300 sq. units
(iii) 241 cm^2
7. (i) 780 cm^2 (ii) 120 mm^2 (iii) 200 cm^2
8. (i) (a) 480 m^3 (b) 432 m^2
(ii) (a) 270 m^3 (b) 330 m^2
(iii) (a) 337.5 m^3 (b) 335 m^2
9. (i) $x = 5$; 84 cm^2 (ii) $x = 12$; 480 cm^2
10. (i) 32.31 m^2 (ii) €650

Answers

11. (i) 410.4 cm^3 (ii) 441.6 cm^2
13.
 - Star opposite yellow circle with red border
 - Square with green border opposite square with circle in it
 - Triangle opposite red and green square
14. E, I
15. (i) triangular prism (ii) 6