

Topic test 2

Surface area and volume

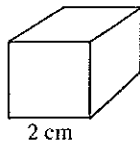
- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 16 free-response questions (60 marks)

Name: _____

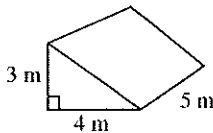
Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

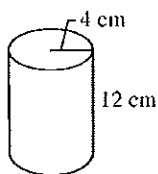
- 1 Find the surface area of this cube.



- A 18 cm^2 B 24 cm^2
C 8 cm^2 D 12 cm^2
- 2 Find the volume of the above cube.
A 6 cm^3 B 8 cm^3
C 24 cm^3 D 12 cm^3
- 3 How many faces has a triangular prism?
A 9 B 5
C 6 D 4
- 4 Find the volume of this prism.

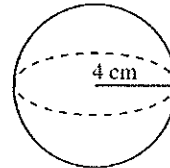


- A 6 m^3 B 12 m^3
C 30 m^3 D 60 m^3
- 5 Find the surface area of the above prism.
A 60 m^2 B 35 m^2
C 30 m^2 D 72 m^2
- 6 Find the capacity of this cylinder.

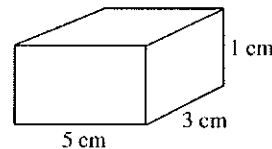


- A 150.8 mL B 1508 mL
C 60.32 mL D 603.2 mL

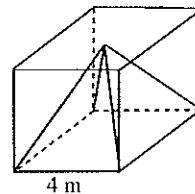
- 7 Find the volume of this sphere.



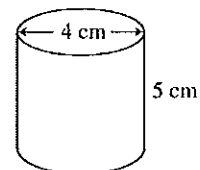
- A 50.27 cm^3 B 67.02 cm^3
C 201.06 cm^3 D 268.08 cm^3
- 8 Find the surface area of this prism.



- A 23 cm^2 B 8 cm^2
C 9 cm^2 D 46 cm^2
- 9 How many litres in a cubic metre?
A 1 B 100
C 1000 D 10 000
- 10 A square pyramid inside a cube covers the base completely and its apex touches the top of the cube. What is the volume (to the nearest m^3) of the remaining space inside the cube?



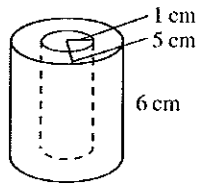
- A 43 m^3 B 32 m^3
C 56 m^3 D 48 m^3
- 11 Find the surface area of this cylinder.



- A 62.83 cm^2 B 25.13 cm^2
C 87.96 cm^2 D 75.40 cm^2

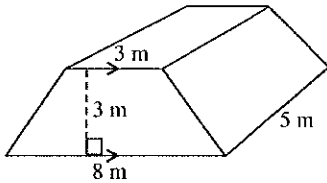
Topic test 2: Surface area and volume *continued*

12 Find the volume of this pipe.



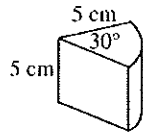
- A 113.10 cm^3 B 301.59 cm^3
 C 452.39 cm^3 D 471.24 cm^3

13 Find the volume of this prism.



- A 82.5 m^3 B 165 m^3
 C 180 m^3 D 127.5 m^3

14 This fraction of a cylinder has a base with sector angle 30° . Find its volume.

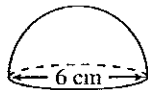


- A 6.54 cm^3 B 65.45 cm^3
 C 32.72 cm^3 D 13.09 cm^3

15 A cube has a surface area of 240 cm^2 . What is the length of one side?

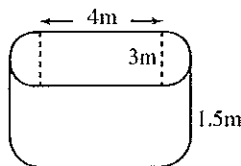
- A 6.21 cm B 6.32 cm
 C 15.4 cm D 20 cm

16 Find the volume of this hemisphere.



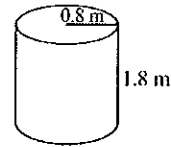
- A 56.55 cm^3 B 113.10 cm^3
 C 452.39 cm^3 D 254.47 cm^3

17 Find the volume of this pool.



- A 28.60 m^3 B 33.21 m^3
 C 19.06 m^3 D 60.41 m^3

18 Find the surface area of this water tank that has the shape of an open cylinder.

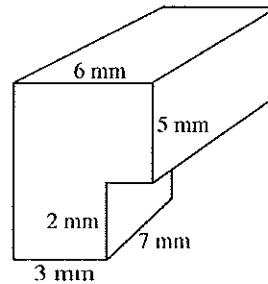


- A 11.06 m^2 B 4.52 m^2
 C 3.62 m^2 D 13.07 m^2

19 Find the volume of the above tank.

- A 11.06 m^3 B 4.52 m^3
 C 3.62 m^3 D 13.07 m^3

20 Find the volume of this prism.



- A 112 mm^3 B 245 mm^3
 C 252 mm^3 D 1260 mm^3

Part B

16 free-response questions

60 marks

Show working where appropriate.

Round answers to two decimal places where appropriate.

21 (3 marks)

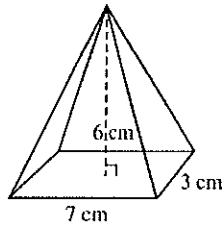
a Draw the net of a cylinder.

b Hence explain why the surface area of a cylinder is given by the formula

$$SA = 2\pi r^2 + 2\pi rh.$$

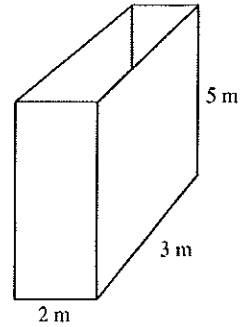
Topic test 2: Surface area and volume *continued*

22 (2 marks) Find the volume of this pyramid.



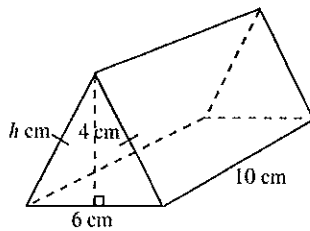
25 (4 marks) This box has no lid.

a Find its surface area.



b Find its capacity in litres.

23 (7 marks) For this triangular prism, find:

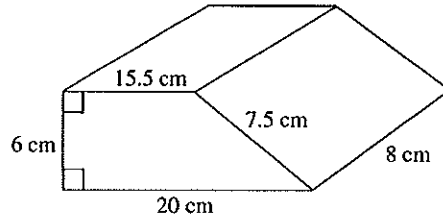


a its volume

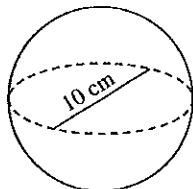
b the value of h

c its surface area

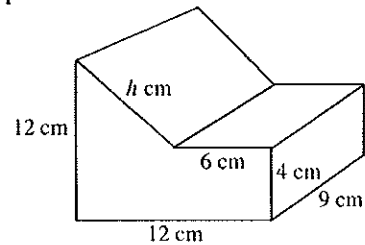
26 (5 marks) Find the surface area of this prism.



24 (2 marks) Find the volume of this sphere.

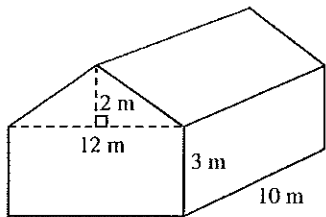


27 (5 marks) Find h and hence the surface area of this prism.

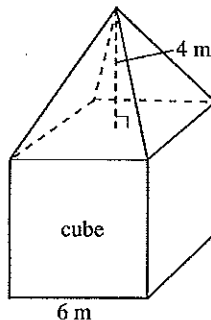


Topic test 2: Surface area and volume *continued*

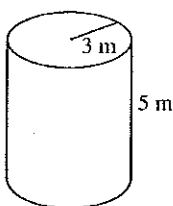
28 (4 marks) Find the volume of this prism.



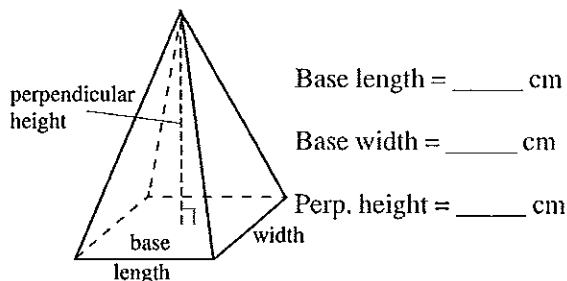
33 (4 marks) Find the volume of this solid.



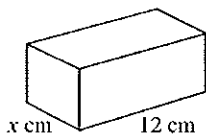
29 (2 marks) Find the curved surface area of this cylinder.



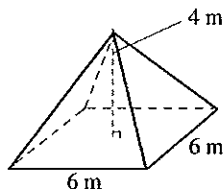
34 (3 marks) If this rectangular prism has a volume of 120 cm^3 , then write a possible value for its base length, base width and perpendicular height.



30 (2 marks) Find the value of x if this square prism has a volume of 192 cm^3 .

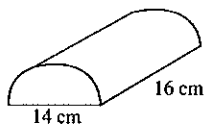


35 (5 marks) Find the surface area of this square pyramid.



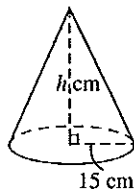
31 (6 marks) A cake has the shape of half a cylinder.

a Find its volume.

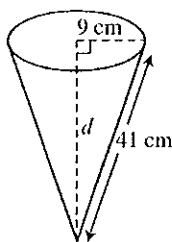


b Find its surface area.

36 (2 marks) A cone has a volume of 4500 cm^3 . If its circular base has a radius of 15 cm , find the height of the cone correct to two decimal places.



32 (4 marks) Find d and the volume of this cone.



END OF TEST.

Use the back of this page for extra working space.

Topic test 2 Surface area and volume

Three allowed: 45 minutes

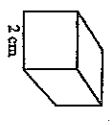
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Name: Good effort!
Clara Cornejo

Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

1 Find the surface area of this cube.



- A 18 cm²
- B 24 cm²
- C 8 cm²
- D 12 cm²

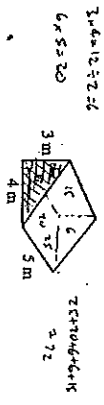
2 Find the volume of the above cube.

- A 6 cm³
- B 8 cm³
- C 24 cm³
- D 12 cm³

3 How many faces has a triangular prism?

- A 9
- B 5
- C 6
- D 4

4 Find the volume of this prism.

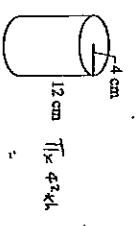


- A 6 m³
- B 12 m³
- C 30 m³
- D 60 m³

5 Find the surface area of the above prism.

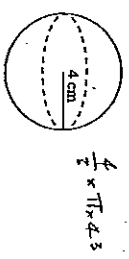
- A 60 m²
- B 35 m²
- C 30 m²
- D 72 m²

6 Find the capacity of this cylinder.



- A 150.8 mL
- B 1508 mL
- C 60.33 mL
- D 603.2 mL

7 Find the volume of this sphere.



- A 50.27 cm³
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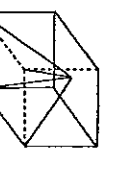


- A 23 cm²
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9 How many litres in a cubic metre?

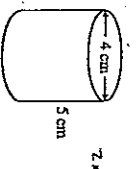
- A 1
- B 100
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10 A square pyramid inside a cube covers the base completely and its apex touches the top of the cube. What is the volume (to the nearest m³) of the remaining space inside the cube?



- A 43 m³
- B 32 m³
- C 56 m³
- D 48 m³

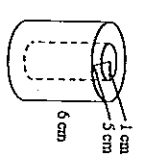
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- A 62.83 cm²
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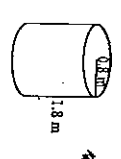
Topic test 2: Surface area and volume continued

12 Find the volume of this pipe.



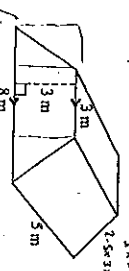
- A 113.10 cm³
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18 Find the surface area of this water tank that has the shape of an open cylinder.



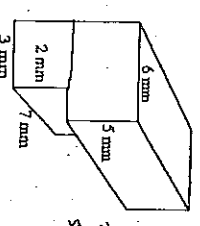
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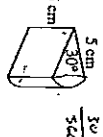
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19 Find the volume of the above tank.



- A 112 mm³
- B 245 mm³
- C 252 mm³
- D 1260 mm³

14 This fraction of a cylinder has a base with sector angle 30°. Find its volume.

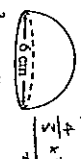


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15 A cube has a surface area of 240 cm². What is the length of one side?

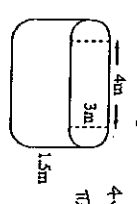
- A 6.21 cm
- B 6.32 cm
- C 15.4 cm
- D 20 cm

16 Find the volume of this hemisphere.



- A 56.55 cm³
- B 113.10 cm³
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- D 254.47 cm³

17 Find the volume of this pool.



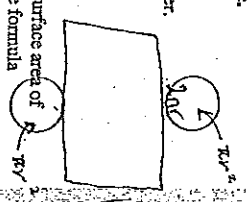
- A 28.60 m³
- B 33.21 m³
- C 19.06 m³
- D 60.41 m³

Part B

16 free-response questions
60 marks
Show working where appropriate.
Round answers to two decimal places where appropriate.

21 (3 marks)

a Draw the net of a cylinder.

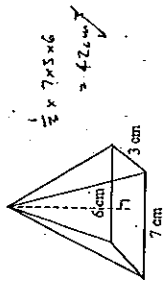


b Hence explain why the surface area of a cylinder is given by the formula $SA = 2\pi r^2 + 2\pi rh$.

Explain you have to find the Area of both circles at the top & then the area of the rectangle.

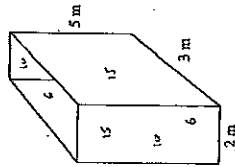
Topic test 2: Surface area and volume continued

22 (2 marks) Find the volume of this pyramid.



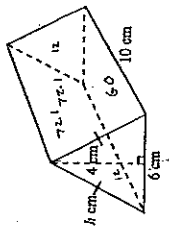
$$\frac{1}{2} \times 7 \times 5 \times 6 = 105$$

25 (4 marks) This box has no lid. measure open box
a Find its surface area.



$$2 \times 15 \times 6 + 2 \times 15 \times 5 + 2 \times 6 \times 5 = 360$$

23 (7 marks) For this triangular prism, find:



a its volume

$$\frac{1}{2} \times 6 \times 10 \times 12 = 360$$

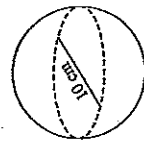
b the value of h

$$6^2 + 10^2 = 12^2 \Rightarrow 36 + 100 = 144 \Rightarrow 136 = 144 \Rightarrow h = 8$$

c its surface area

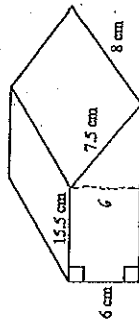
$$2 \times \left(\frac{1}{2} \times 6 \times 10 \right) + 2 \times (6 \times 12) + 2 \times (10 \times 12) = 360$$

24 (2 marks) Find the volume of this sphere.



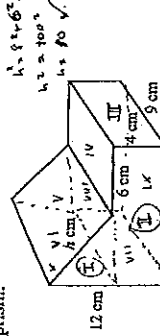
$$\frac{4}{3} \times \pi \times 5^3 = \frac{4}{3} \times \pi \times 125 = \frac{500\pi}{3} \approx 523.6$$

26 (5 marks) Find the surface area of this prism.



$$2 \times \left(\frac{1}{2} \times 6 \times 8 \right) + 2 \times (6 \times 15.5) + 2 \times (8 \times 15.5) + 2 \times (10 \times 15.5) = 605$$

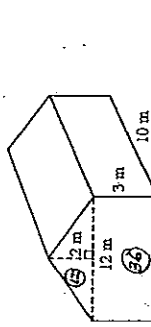
27 (5 marks) Find h and hence the surface area of this prism.



$$2 \times \left(\frac{1}{2} \times (6+9) \times 4 \right) + 2 \times (6 \times 12) + 2 \times (9 \times 12) = 360$$

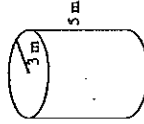
Topic test 2: Surface area and volume continued

28 (4 marks) Find the volume of this prism.



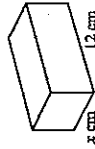
$$12 \times 10 \times 3 = 360$$

29 (2 marks) Find the curved surface area of this cylinder.



$$2\pi r h = 2 \times \pi \times 3 \times 5 = 94.2$$

30 (2 marks) Find the value of x if this square prism has a volume of 192 cm³.



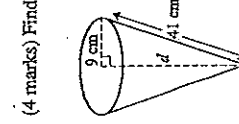
$$x^2 \times 12 = 192 \Rightarrow x^2 = 16 \Rightarrow x = 4$$

31 (6 marks) A cake has the shape of half a cylinder.



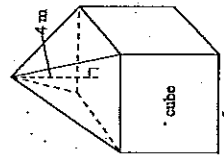
$$\pi r^2 l = \pi \times 7^2 \times 16 = 789.56$$

32 (4 marks) Find d and the volume of this cone.



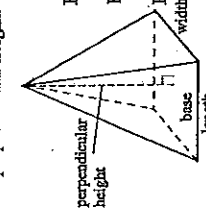
$$d = 40, V = \frac{1}{3} \pi r^2 h = 3560.87$$

33 (4 marks) Find the volume of this solid.



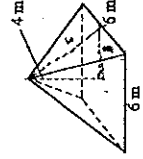
$$6 \times 6 \times 4 + \frac{1}{3} \times 6 \times 6 \times 4 = 168 + 96 = 264$$

34 (3 marks) If this rectangular prism has a volume of 120 cm³, then write a possible value for its base length, base width and perpendicular height.



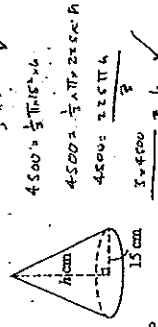
$$4 \times 6 \times 5 = 120$$

35 (5 marks) Find the surface area of this square pyramid.



$$6 \times 6 + 4 \times \left(\frac{1}{2} \times 6 \times 4 \right) = 36 + 48 = 84$$

36 (2 marks) A cone has a volume of 4500 cm³. If its circular base has a radius of 15 cm, find the height of the cone correct to two decimal places.



$$\frac{4500 \times 3}{\pi \times 15^2} = h \Rightarrow h = 14.0459$$

END OF TEST. Use the back of this page for extra working space.