Surface area and volume: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes. Use the π key on your calculator unless a question says otherwise.

Section A: Consolidating (Questions 1-4)

Question 1

Find the volume of a rectangular prism that is 8 cm long, 5 cm wide and 3 cm high.

Question 2

Convert:

(a) 3 m^3 to litres

(b) 2500 cm^3 to litres

(c) 4 m^2 to cm^2

Question 3

Find the volume of a cylinder with radius 5 cm and height 10 cm, correct to 1 decimal place.

Question 4

Find the total surface area of a cube with side length 6 cm.

Section B: Standard (Questions 5-10)

Question 5

A prism is 15 cm long. Its cross-section is an L-shape made from two rectangles that do not overlap: one is 10 cm by 4 cm and the other is 4 cm by 6 cm.

(a) Find the area of the cross-section.

(b) Find the volume of the prism.

Question 6

A solid cone has base radius 5 cm and perpendicular height 12 cm.

(a) Find the slant height of the cone.

(b) Find the volume of the cone, correct to 1 decimal place.

(c) Find the total surface area of the cone (including the base), correct to 1 decimal place.

Question 7

A ball is a sphere with radius 6 cm. Find, correct to 1 decimal place:

(a) its volume

(b) its surface area

Question 8

A grain silo is a cylinder with a hemisphere on top. The cylinder and hemisphere both have radius 3 m, and the cylinder is 10 m tall.

(a) Find the exact volume of the silo in terms of π.

(b) Find the volume correct to 1 decimal place.

(c) How many kilolitres of grain could the silo hold, correct to the nearest kilolitre? (1 m^3 = 1 kL)

Question 9

A solid is made by gluing a cube with side 2 cm onto the centre of the top face of a cube with side 4 cm.

(a) Find the total surface area of the solid.

(b) Explain why the answer is not simply the surface area of the large cube plus the surface area of the small cube.

Question 10

A square-based pyramid has a base of side 10 m and a perpendicular height of 12 m.

(a) Find its volume.

(b) Show that the height of each triangular face (the slant height, measured from the middle of a base edge to the apex) is 13 m.

(c) Find the total surface area of the pyramid.

Surface area and volume: answers

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Question 1

Answer: 120 cm^3 ($8 \times 5 \times 3$)

Question 2

Answer: (a) 3000 L (b) 2.5 L (c) 40,000 cm^2

Question 3

Answer: 785.4 cm^3 ($\pi \times 5^2 \times 10 = 250\pi$)

Question 4

Answer: 216 cm^2 (6×36)

Question 5

Answer: (a) 64 cm^2 (40 + 24) (b) 960 cm^3

Question 6

Answer: (a) 13 cm (b) 314.2 cm^3 (100π) (c) 282.7 cm^2 ($25\pi + 65\pi = 90\pi$)

Question 7

Answer: (a) 904.8 cm^3 (288π) (b) 452.4 cm^2 (144π)

Question 8

Answer: (a) 108π m^3 ($90\pi + 18\pi$) (b) 339.3 m^3 (c) 339 kL

Question 9

Answer: (a) 112 cm^2 ($96 + 4 \times 4$) (b) Two 2×2 squares are hidden where the cubes are glued (the bottom of the small cube and the part of the large cube's top it covers), so adding 96 + 24 = 120 counts 8 cm^2 that is not on the outside.

Question 10

Answer: (a) 400 m^3 ($\frac{1}{3} \times 100 \times 12$) (b) $\sqrt{(12^2 + 5^2)} = \sqrt{(169)} = 13$ (c) 360 m^2 ($100 + 4 \times \frac{1}{2} \times 10 \times 13$)