The Panda Math Tutor

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3D Surface Area and Volume

Student Worksheet

Questions & Working Space

IGCSE Mathematics

Name: _____

Date: _____

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Prepared by

Nikolas Agisilaou

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Note

How to use this worksheet. These questions are built *strictly* on the *3D Surface Area and Volume* notes: units and conversions, cuboids and cubes, prisms, cylinders, pyramids, cones, spheres and hemispheres, composite solids, and real-world applications.

Working space. Ruled lines are provided after each question — show *all* of your working there, name the formula you are using, and give your answer with the correct units. Harder questions have a teal **Hint** box; try the question first and use the hint only if you are stuck.

Accuracy. Keep π exact all the way through and round only at the very end. Where a question says "in terms of π", leave the π in your answer; where it asks for a number of decimal places or significant figures, round only the final line.

Checking your answers. Full step-by-step solutions, a marking scheme for the exam paper, and a quick answer key are in the separate booklet *"3D Surface Area and Volume — Solutions & Answer Key."* Try each question honestly before you look.

Method

Formulas you will need

Solid	Volume	Surface area
Cube (side s)	s^3	$6s^2$
Cuboid	ℓwh	$2(\ell w + \ell h + wh)$
Prism	$A \times L$	$2A + PL$
Cylinder	$\pi r^2 h$	$2\pi r(h + r)$
Pyramid	$\frac{1}{3}Ah$	base + triangular faces
Cone	$\frac{1}{3}\pi r^2 h$	$\pi r(l + r)$
Sphere	$\frac{4}{3}\pi r^3$	$4\pi r^2$
Hemisphere	$\frac{2}{3}\pi r^3$	$3\pi r^2$

A = cross-sectional area, P = perimeter of cross-section, L = length, l = slant height.

For a cone: $l^2 = r^2 + h^2$. For a square-based pyramid: $l^2 = h^2 + \left(\frac{a}{2}\right)^2$.

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1 Part I — Topic-by-Topic Exercises

1.1 Units and Conversions

Exercise U1 *[Basic]*

Convert: (a) $4\,\text{cm}^3$ into mm^3 (b) $7\,\text{m}^3$ into cm^3

Exercise U2 *[Basic]*

Convert: (a) $2500\,\text{cm}^3$ into litres (b) $0.35\,\text{m}^3$ into litres

Exercise U3 *[Standard]*

A water butt holds $0.75\,\text{m}^3$ of rainwater. Express this amount in

(a) cm^3 (b) litres (c) millilitres

Exercise U4 *[Intermediate]*

A student writes "$1\,\text{m}^3 = 100\,\text{cm}^3$, because $1\,\text{m} = 100\,\text{cm}$". Explain exactly what is wrong with this reasoning and state the correct conversion.

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Preview ends here

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