

Solid	Surface Area	Volume
height, <i>h</i> width, <i>w</i>	2hw + 2hl + 2wl	h x w x l
Cvlinder	$2\pi r^2 + 2\pi rh$	$\pi r^2 h$
	$\pi r^2 + \pi r l$	1 2-
	where $l = \sqrt{r^2 + h^2}$	$\frac{1}{3}\pi r^2 h$
Cone		
Pyramid	Sum of areas of all the faces	$\frac{1}{3}$ x base area x h
Sphare	$4\pi r^2$	$\frac{4}{3}\pi r^3$
Shiele		



1. Find the surface area and volume of the following figures.





(c)		1.43 m 0.92 m 0.67 m
(d)		26 cm 20 cm
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2. A conical tent has base radius 2 m and height 5 m.

(a) Find the slant height s, to 2 decimal places.

(b) Find the surface of the conical tent.





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(b)		2 cm
(c)	1	2 m 46 m



The angle between a line and a plane



2. Find the measure of the angle AHG and DFH.





Exercise

1. A solid glass paperweight consists of a hemisphere of diameter 6 cm on top of a cuboid with a square base of length 6 cm, as shown in the diagram.

diagram not to scale



The height of the cuboid, x cm, is equal to the height of the hemisphere.

- (a) (i) Write down the value of *x*.
- (ii) Calculate the volume of the paperweight.

 1 cm^3 of glass has a mass of 2.56 grams.

(b) Calculate the mass, in grams, of the paperweight.



2. Haruka has an eco-friendly bag in the shape of a cuboid with width 12 cm, length 36 cm and height of 9 cm. The bag is made from five rectangular pieces of cloth and is open at the top.



(a) Calculate the area of cloth, in cm^2 , needed to make Haruka's bag. (b) Calculate the volume, in cm^3 , of the bag.

Nanako decides to make her own eco-friendly bag in the shape of a cuboid such that the surface area is minimized. The width of Nanako's bag is *x* cm, its length is three times its width and its height is *y* cm.



The volume of Nanako's bag is 3888 cm^3 .

(This question continues on the following page.)



(c) Use this value to write down, and simplify, the equation in x and y for the volume of Nanako's bag.

(d) Write down and simplify an expression in x and y for the area of cloth, *A*, used to make Nanako's bag.

(e) Use your answers to parts (c) and (d) to show that

$$A = 3x^2 + \frac{10368}{x}.$$





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3. A solid right circular cone has a base radius of 21 cm and a slant height of 35 cm. A smaller right circular cone has a height of 12 cm and a slant height of 15 cm, and is removed from the top of the larger cone, as shown in the diagram.



(a) Calculate the radius of the base of the cone which has been removed.

(b) Calculate the curved surface area of the cone which has been removed.

(c) Calculate the curved surface area of the remaining solid.



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4. Julio is making a wooden pencil case in the shape of a large pencil.The pencil case consists of a cylinder attached to a cone, as shown.The cylinder has a radius of *r* cm and a height of 12 cm. The cone has a base radius of *r* cm and a height of 10 cm.



(a) Find an expression for the slant height of the cone in terms of r.

The total external surface area of the pencil case rounded to 3 significant figures is 570 cm^2 .

(b) Using your graphic display calculator, calculate the value of *r*.

