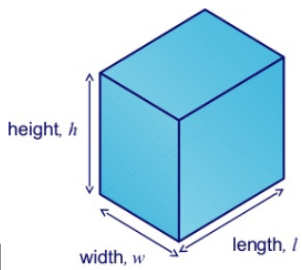
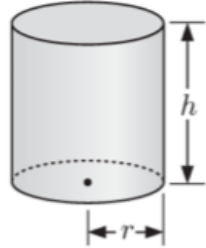
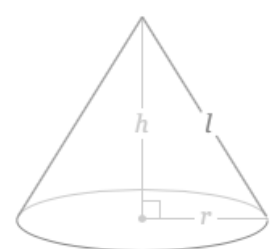
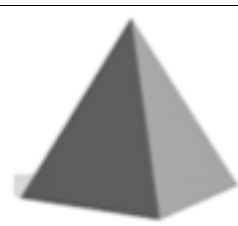

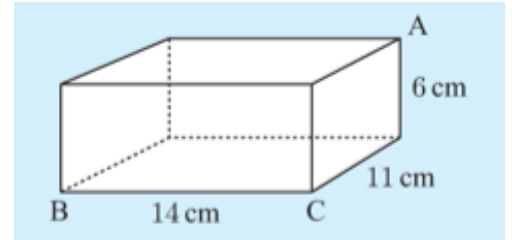


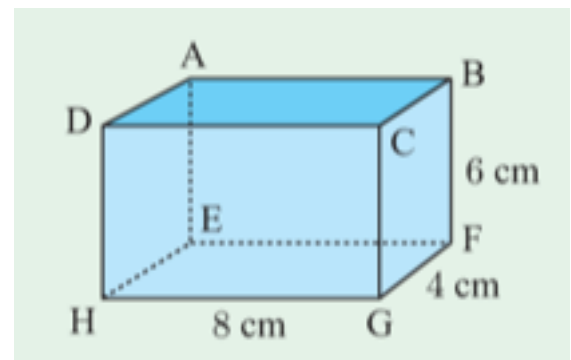
Solid	Surface Area	Volume
Cuboid 	$2hw + 2hl + 2wl$	$h \times w \times l$
Cylinder 	$2\pi r^2 + 2\pi rh$	$\pi r^2 h$
Cone 	$\pi r^2 + \pi rl$ where $l = \sqrt{r^2 + h^2}$	$\frac{1}{3} \pi r^2 h$
Pyramid 	Sum of areas of all the faces	$\frac{1}{3} \times \text{base area} \times h$
Sphere 	$4\pi r^2$	$\frac{4}{3} \pi r^3$

The angle between a line and a plane

1. Find the measure of angle ABC.



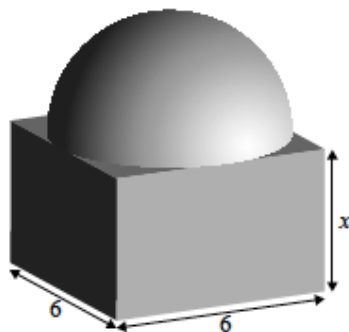
2. Find the measure of the angle AHG and DFH.



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



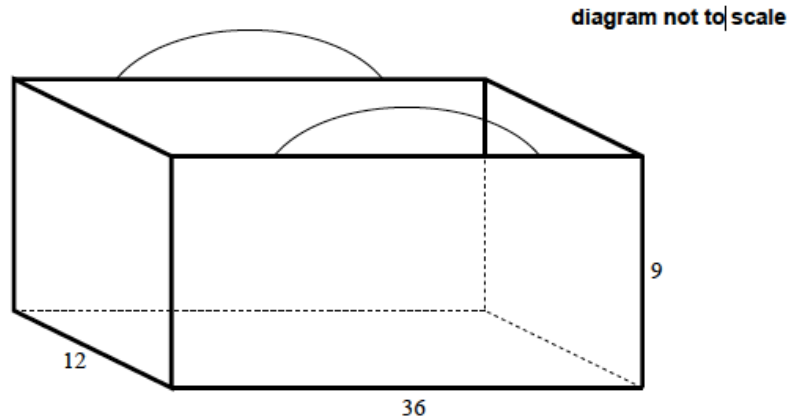
The height of the cuboid, x cm, is equal to the height of the hemisphere.

- (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.

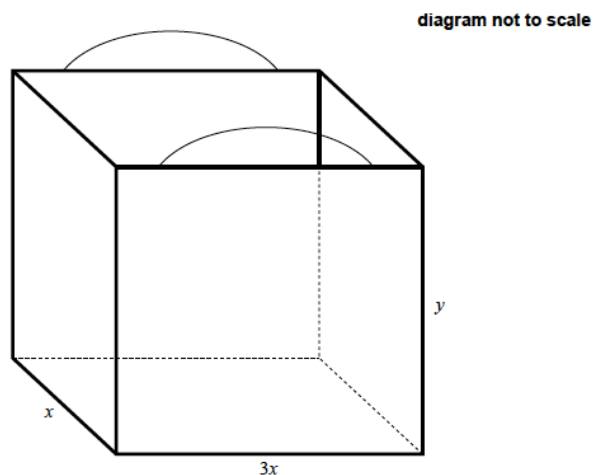
- (b) Calculate the mass, in grams, of the paperweight.

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.

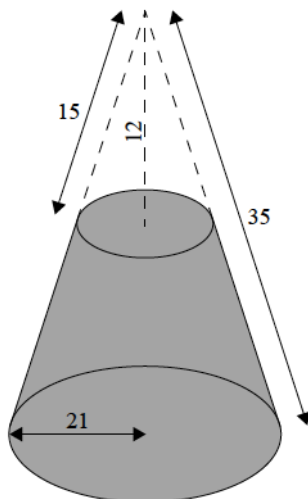
Nanako decides to make her own eco-friendly bag in the shape of a cuboid such that the surface area is minimized. The width of Nanako's bag is x cm, its length is three times its width and its height is y cm.



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

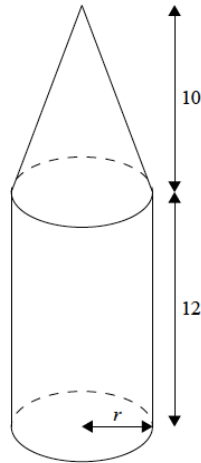
(This question continues on the following page.)

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.

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 .
