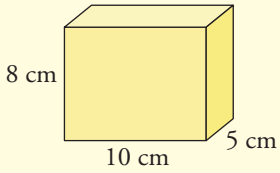
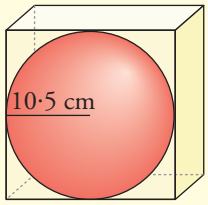
chapter 21 review

1. (a) ✍ A rectangular box has measurements as shown.

Calculate the volume of the box.



(b) ✍ A solid sphere, with a radius of 10·5 cm, fits exactly into a cubic box, as shown. Taking $\pi = \frac{22}{7}$, calculate each of the following:



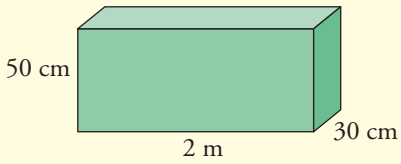
(i) the volume of the sphere

(ii) the length of the side of the box

(iii) the volume of the box not occupied by the sphere.

2. (a) ✍ Calculate the volume of a sphere of radius 30 cm. Take $\pi = 3$.

(b) ✍ A rectangular tank with length measurements 2 m by 30 cm by 50 cm is shown in the diagram.

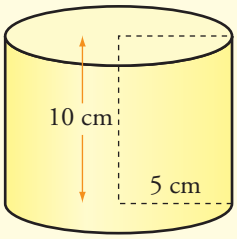


(i) Calculate in litres the capacity of the tank.

(ii) If 180 litres of liquid were poured into the tank, calculate the height of the liquid in the tank.

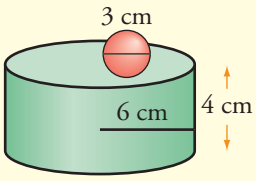
(c) ✍ A sphere has the same surface area as the curved surface area of a cylinder of height 9 cm and radius 8 cm. Find, in cm, the radius of the sphere.

3. **(a)** ✍ A cylinder has measurements as shown.



Calculate, in terms of π, the volume of the cylinder.

(b) ✍ A solid glass golf trophy has a solid cylinder as its base with a sphere on top. The measurements of the trophy are shown in the diagram.

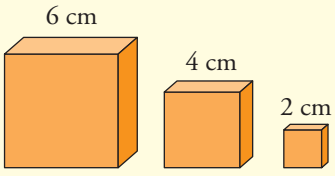


Taking $\pi = 3$, calculate, in cm^3, the volume of glass required to make the trophy.

(c) ✍ Calculate the total surface area of the trophy in part **(b)**, giving your answer correct to the nearest cm^2.

4. **(a)** ✍ A sphere has a radius of 6 cm. Taking $\pi = 3{\cdot}14$, calculate, correct to the nearest whole number, the volume of the sphere.

(b) ✍ The diagram shows three solid cubes of metal of sides 6 cm, 4 cm and 2 cm.



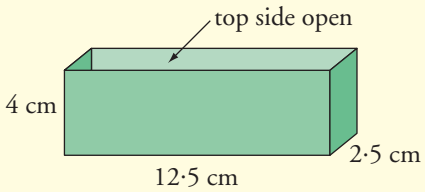
Calculate each of the following:

(i) the total volume of metal in the three cubes

(ii) the total surface area of the three cubes.

(c) ✍ The cubes in part **(b)** are melted down to form a solid cylinder of height 6 cm. Taking $\pi = 3$, calculate the radius of the cylinder.

5. **(a)** ✍ An open rectangular box has measurements as shown. Calculate the total surface area of the box.



(b) ✍ Ten ice cubes are fully melted inside a cylindrical container of radius 3 cm. If the water which is formed rises to a height of 10 cm in the cylinder, find the length of the side of one of the ice cubes. Take $\pi = 3$.

(c) **(i)** ✍ Calculate, in terms of π, the volume of a sphere with a diameter of length 6 cm.

(ii) ✍ A cylinder of height 9 cm has a volume that is equal to 25 times the volume of the sphere. Calculate the length of the radius of the cylinder.

6. **(a)** ✍ The curved surface area of a cylinder with a radius of 7 cm is 880 cm^2. Calculate the height of the cylinder. Take $\pi = \frac{22}{7}$.

(b) ✍ A solid rectangular block has a length of 15 cm and a width of 8 cm. The volume of the block is 360 cm^3.

(i) Find the height of the block in cm.

(ii) Find the total surface area of the block in cm^2.

(c) ✍ One cylinder is four times the volume of another cylinder. Both cylinders have the same height. Find the value of the radius of the big cylinder ÷ the radius of the small cylinder.