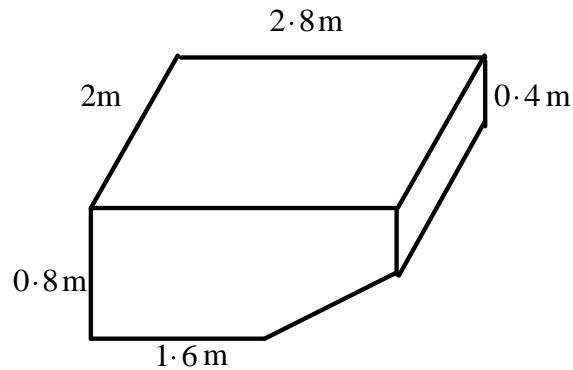
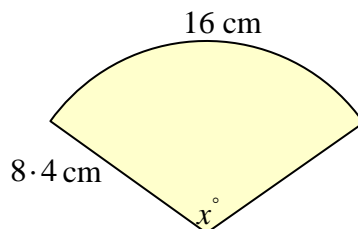


1. Calculate the volume of each of these solids, giving your answers correct to 3 significant figures.
- (a) Cylinder, radius 6.4 cm , height 8.6 cm .
 - (b) Sphere, radius 5.4 cm .
 - (c) Cone, radius 5.2 cm , height 10.4 cm .
2. Find the volume in cubic metres of the underground water tank (of uniform cross-section) sketched below.

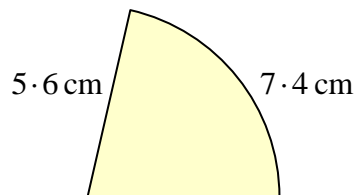


3. Solve each of these equations, giving your solutions as integers or fractions.
- (a) $3x - 4 = x + 13$
 - (b) $5(2x - 5) = 13 - 3x$
 - (c) $13 - y = 3y + 5$
 - (d) $4(1 - t) = 5(t + 1)$
4. A drinks container is in the shape of a cylinder with radius 30 cm and height 50 cm .
- (a) Calculate the volume of the container, correct to 2 significant figures.
 - (b) Liquid from the full container can fill 1800 cups, in the shape of cones, each of radius 3 cm . What will be the height of liquid in each cup?
5. Find the volume of the largest sphere which can be fitted into a cubical box whose edges measure 4.8 cm . Give your answer correct to 2 significant figures.
6. The length of the curved arc in the sector sketched below is 16 cm and the radius is 8.4 cm .

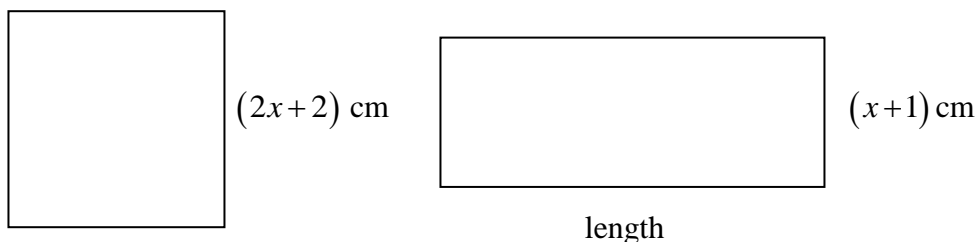


- (a) Find the value of x , correct to 1 decimal place.
- (b) Find the area of the sector.

7. Find the area of the sector sketched below.



8. The square and the rectangle sketched below have equal perimeters.
Show that the length of the rectangle is $3(x+1)$ cm.



9. The mass of water at the earth's surface is 1.41×10^{18} tonnes.
The total mass of the earth is 5.97×10^{21} tonnes.
Express the mass of water on the earth's surface as a percentage of the total mass of the earth.
Give your answer in scientific notation.

10. Simplify

(a). $(1 + \sqrt{2})^2$ (b). $(3 - \sqrt{2})(3 + \sqrt{2})$ (c). $(\sqrt{3})^3$ (d). $(2\sqrt{2})^2$

11. Evaluate

(a). $16^{\frac{1}{2}}$ (b). $25^{-\frac{1}{2}}$ (c). 4^{-1} (d). 1^{-4}
(e). $8^{\frac{2}{3}}$ (f). $8^{-\frac{2}{3}}$ (g). $16^{\frac{3}{2}}$ (h). $36^{-\frac{1}{2}}$

12. The average rate of flow of the river Tay at Perth is about 160 cubic metres per second.
How many millilitres of water will flow under the Tay Bridge at Perth in a century?
Give your answer in standard form and round it off sensibly.

13. In her purse, Jenny has 20 coins, with a total value of £5.
There are three denominations of coin: 10p, 20p and 50p in her purse.
She has more 50p coins than 10p coins.
How many of each type of coin does she have? Explain your answer fully.