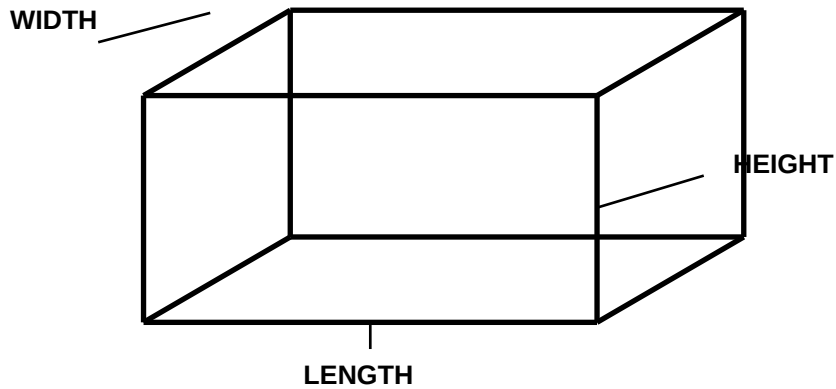


GRADE 8 MATHEMATICS

VOLUME & SURFACE AREA

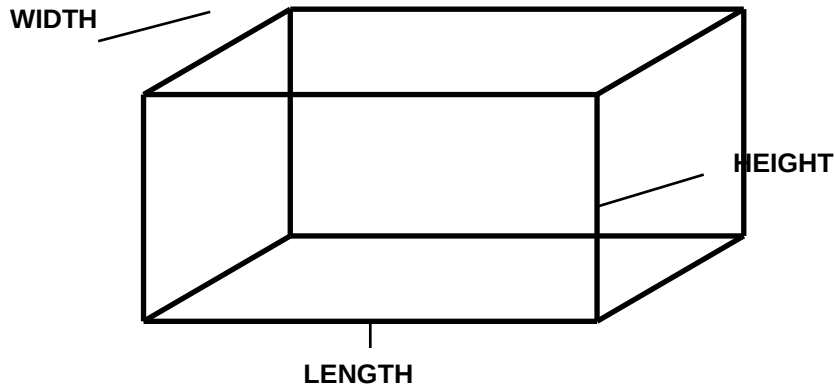


3-D VECTOR DIAGRAM EDITION

Cuboids, cubes, cylinders and prisms are shown as genuine 3-D figures with thick, printer-safe vector lines.

Worksheet 1 - Volume of Cubes & Cuboids

Show all working. Include correct square or cubic units. Use the value of pi stated in each question.



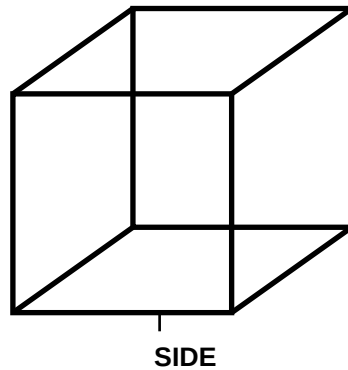
1. Find the volume of a cuboid measuring 12 cm by 8 cm by 5 cm.
2. Find the volume of a cube with side 7 cm.
3. A cuboid has volume 720 cm^3 , length 12 cm and width 10 cm. Find its height.
4. A cube has volume $1,000 \text{ cm}^3$. Find its side length.
5. A rectangular tank measures 2.5 m by 1.8 m by 1.2 m. Find its volume.
6. A box has dimensions 45 cm by 30 cm by 20 cm. Find its capacity in litres.
7. A cuboid has volume $1,512 \text{ cm}^3$, length 18 cm and width 14 cm. Find its height.
8. A cube has side 12 cm. Find its volume and the total length of all its edges.
9. A storage container is 1.2 m long, 0.8 m wide and 0.75 m high. Find its volume in litres.
10. Challenge: A cuboid has dimensions in the ratio 2:3:5 and volume 810 cm^3 . Find its dimensions.

Answer Key 1 - Volume of Cubes & Cuboids

1. 480 cm³.
2. 343 cm³.
3. 6 cm.
4. 10 cm.
5. 5.4 m³.
6. 27 L.
7. 6 cm.
8. 1,728 cm³; 144 cm.
9. 720 L.
10. 6 cm, 9 cm, 15 cm.

Worksheet 2 - Surface Area of Cubes & Cuboids

Show all working. Include correct square or cubic units. Use the value of pi stated in each question.



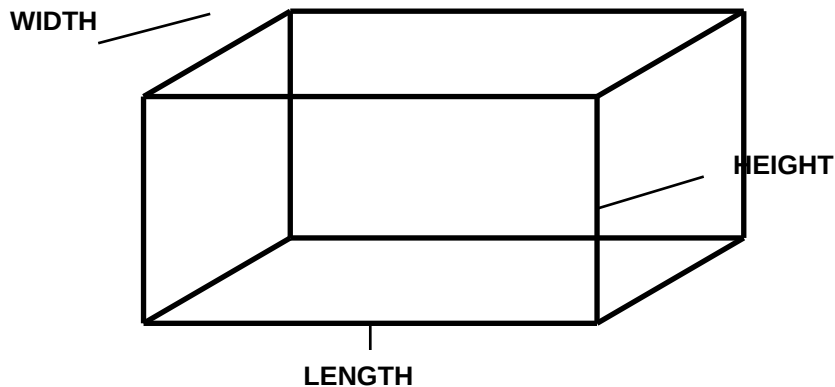
1. Find the total surface area of a cube with side 6 cm.
2. Find the total surface area of a cuboid measuring 10 cm by 7 cm by 4 cm.
3. A cuboid is 12 cm by 8 cm by 5 cm. Find its total surface area.
4. Find the surface area of a cube with side 9 cm.
5. A box is 20 cm by 15 cm by 10 cm. Find the area of cardboard needed to make the closed box.
6. A cuboid is 14 cm long, 9 cm wide and 6 cm high. Find its surface area.
7. A cube has surface area 864 cm^2 . Find its side length.
8. A cuboid has surface area 286 cm^2 , length 11 cm and width 5 cm. Find its height.
9. A rectangular gift box measures 30 cm by 20 cm by 12 cm. How much paper is needed to cover it completely?
10. Challenge: Two cubes each have side 5 cm and are joined face-to-face. Find the surface area of the resulting cuboid.

Answer Key 2 - Surface Area of Cubes & Cuboids

1. 216 cm².
2. 236 cm².
3. 392 cm².
4. 486 cm².
5. 1,300 cm².
6. 528 cm².
7. 12 cm.
8. 4 cm.
9. 2,640 cm².
10. 250 cm².

Worksheet 3 - Volume & Capacity

Show all working. Include correct square or cubic units. Use the value of pi stated in each question.



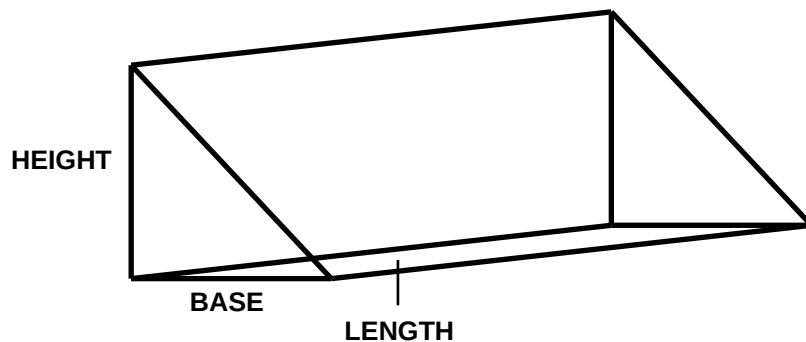
1. Convert 3.5 m^3 to litres.
2. Convert $4,250 \text{ cm}^3$ to litres.
3. A tank holds 2.4 m^3 of water. How many litres is this?
4. A bottle holds 750 mL. How many such bottles fill 6 L?
5. A rectangular aquarium is 80 cm by 40 cm by 50 cm. Find its capacity in litres.
6. A water tank is 2 m by 1.5 m by 1.2 m. It is 75% full. How many litres of water are in it?
7. A container holds $18,000 \text{ cm}^3$. Express its capacity in litres.
8. A cuboid tank has base area 2.5 m^2 and height 1.6 m. Find its capacity in litres.
9. A 12 L bucket is used to fill a 300 L tank. How many full buckets are needed?
10. Challenge: A tank measures 1.8 m by 1.2 m by 1 m. Water is pumped in at 30 L per minute. How long will it take to fill the tank?

Answer Key 3 - Volume & Capacity

- 1.** 3,500 L.
- 2.** 4.25 L.
- 3.** 2,400 L.
- 4.** 8 bottles.
- 5.** 160 L.
- 6.** 2,700 L.
- 7.** 18 L.
- 8.** 4,000 L.
- 9.** 25 buckets.
- 10.** 72 minutes.

Worksheet 4 - Prisms & Cylinders

Show all working. Include correct square or cubic units. Use the value of pi stated in each question.



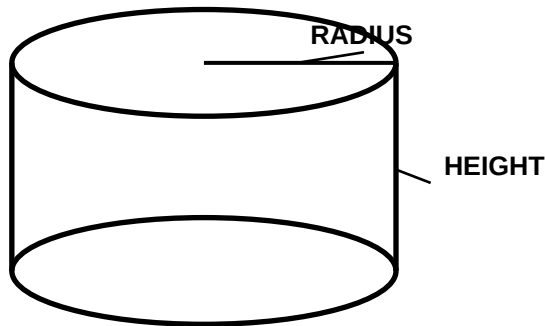
1. A prism has cross-sectional area 24 cm^2 and length 10 cm . Find its volume.
2. A triangular prism has triangular cross-section area 30 cm^2 and length 12 cm . Find its volume.
3. A cylinder has radius 5 cm and height 10 cm . Find its volume using $\pi = 3.14$.
4. A cylinder has radius 7 cm and height 8 cm . Find its volume using $\pi = 22/7$.
5. A cylinder has volume $1,570 \text{ cm}^3$ and radius 5 cm . Find its height using $\pi = 3.14$.
6. A prism has volume 540 cm^3 and length 15 cm . Find its cross-sectional area.
7. A cylindrical tank has radius 2 m and height 3 m . Find its capacity in litres using $\pi = 3.14$.
8. A triangular prism has cross-sectional area 18 cm^2 and length 25 cm . Find its volume.
9. A cylinder has diameter 12 cm and height 15 cm . Find its volume using $\pi = 3.14$.
10. Challenge: Two cylinders have the same height and one has twice the radius of the other. How many times as large is its volume?

Answer Key 4 - Prisms & Cylinders

1. 240 cm^3 .
2. 360 cm^3 .
3. 785 cm^3 .
4. $1,232 \text{ cm}^3$.
5. 20 cm .
6. 36 cm^2 .
7. $37,680 \text{ L}$.
8. 450 cm^3 .
9. $1,695.6 \text{ cm}^3$.
10. 4 times as large.

Worksheet 5 - Surface Area in Real Life

Show all working. Include correct square or cubic units. Use the value of pi stated in each question.



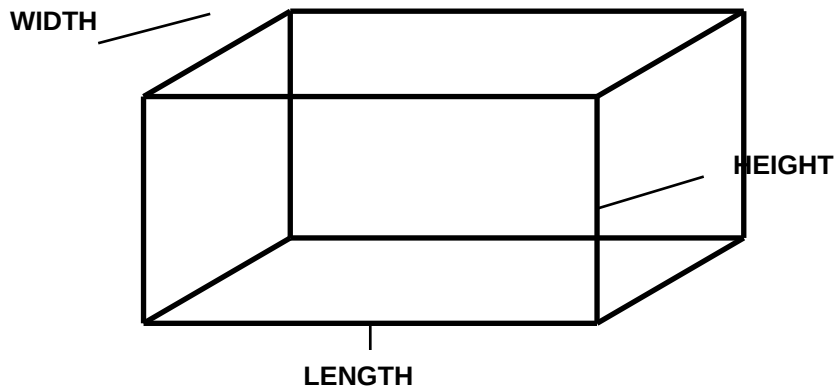
1. A closed cube-shaped box has side 10 cm. Find the cardboard area required.
2. A cuboid storage box is 40 cm by 25 cm by 20 cm. Find its total surface area.
3. A closed cylindrical can has radius 4 cm and height 10 cm. Find its total surface area using $\pi = 3.14$.
4. A cube-shaped gift box has side 15 cm. Find its surface area.
5. A water tank is a cuboid 3 m by 2 m by 1.5 m. Find the outside surface area if the tank is closed.
6. A rectangular room is 6 m by 4 m by 3 m. Find the area of its four walls only.
7. A cuboid package is 50 cm by 30 cm by 20 cm. Find the area of all six faces.
8. A cylindrical drum has radius 0.5 m and height 1.2 m. Find its curved surface area using $\pi = 3.14$.
9. A cube has side 8 cm. If each face is covered with a square label, what total label area is needed?
10. Challenge: A cuboid has length 2 m, width 1.5 m and height 1 m. Find its total surface area and volume.

Answer Key 5 - Surface Area in Real Life

1. 600 cm^2 .
2. $4,600 \text{ cm}^2$.
3. 351.68 cm^2 .
4. $1,350 \text{ cm}^2$.
5. 21 m^2 .
6. 60 m^2 .
7. $6,200 \text{ cm}^2$.
8. 3.768 m^2 .
9. 384 cm^2 .
10. Surface area = 11 m^2 ; volume = 3 m^3 .

Worksheet 6 - Volume & Surface Area Challenge

Show all working. Include correct square or cubic units. Use the value of pi stated in each question.



1. A cuboid has volume 960 cm^3 and dimensions 12 cm by 10 cm by h. Find h and surface area.
2. A cube has volume $2,197 \text{ cm}^3$. Find its side and surface area.
3. A cuboid measures 15 cm by 12 cm by 8 cm. Find volume, surface area and total edge length.
4. A tank is 2 m by 1.5 m by 1 m and is 80% full. How many litres of water does it contain?
5. A cuboid and a cube both have volume $1,000 \text{ cm}^3$. The cuboid has dimensions 20 cm by 10 cm by 5 cm. Compare their surface areas.
6. A cylinder has radius 3 cm and height 14 cm. Find its volume using $\pi = 22/7$.
7. A cuboid has surface area 376 cm^2 , length 10 cm and width 8 cm. Find its height.
8. A closed cube has surface area $1,176 \text{ cm}^2$. Find its side and volume.
9. A prism has cross-sectional area 42 cm^2 and volume $1,260 \text{ cm}^3$. Find its length.
10. Final challenge: A rectangular tank has base 2 m by 1.5 m and height 1.2 m. It is filled at 45 L/min. How long does filling take?

Answer Key 6 - Volume & Surface Area Challenge

1. $h = 8 \text{ cm}$; surface area = 592 cm^2 .
2. Side = 13 cm ; surface area = $1,014 \text{ cm}^2$.
3. Volume = $1,440 \text{ cm}^3$; surface area = 792 cm^2 ; total edge length = 140 cm .
4. $2,400 \text{ L}$.
5. Cuboid = 700 cm^2 ; cube = 600 cm^2 ; difference = 100 cm^2 .
6. 396 cm^3 .
7. 6 cm .
8. Side = 14 cm ; volume = $2,744 \text{ cm}^3$.
9. 30 cm .
10. 80 minutes .