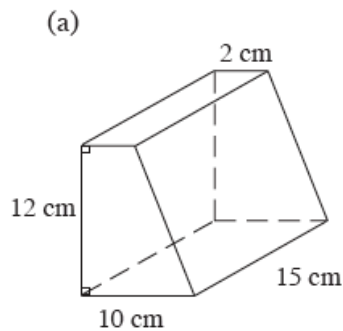
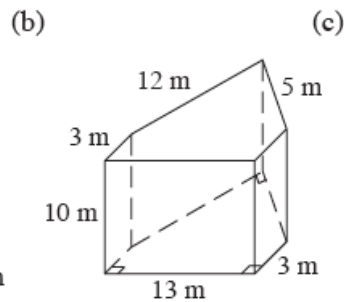


Volumes, Areas and Lengths

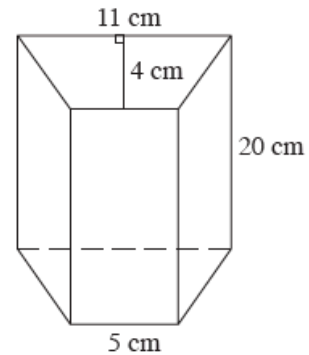
1. Calculate the volume of each of the following prisms:



Trapezoidal prism

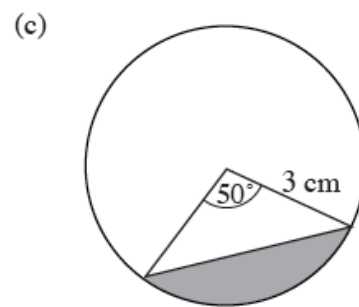
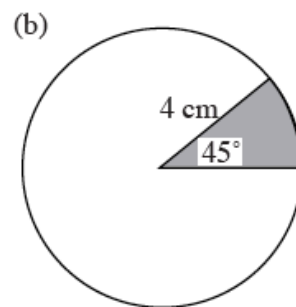
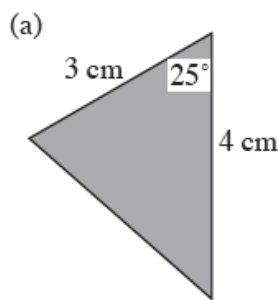


Pentagonal prism



Trapezoidal prism

2. What are the areas of the shaded regions in the following figures:



3. What is the volume of a sphere with:

- (a) radius 4 cm, (b) radius 21 cm,
(c) diameter 6.42 cm, (d) diameter 2.5 cm?

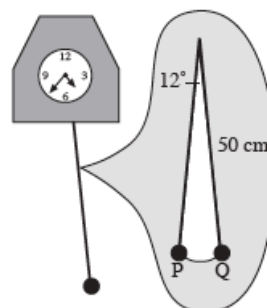
4. What is the radius of a sphere whose volume is:

- (a) $1437\frac{1}{3} \text{ cm}^3$, (b) $288\pi \text{ cm}^3$?

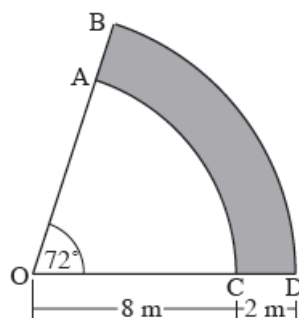
5. A spherical container is 20 cm in diameter. Calculate the volume of water if the container is :
 (a) half-filled with water, (b) filled completely with water.
6. A spherical lead ball 15 cm in radius is melted and made into smaller spherical balls of radius 3 cm each. How many smaller balls can be obtained?
7. The side of the base of a square pyramid is 7 m long. Its height is 4.5 m. Find the volume of the pyramid.
8. A square pyramid has a volume of 270 m^3 and a height of 10 m. Calculate:
 (a) the area of its base, (b) the length of the side of its base.
9. The length and breadth of the base of a rectangular pyramid are 8.4 m and 7.5 m respectively. Its height is 10 m. Find the volume of the pyramid.
10. The volume of a rectangular pyramid is 72.5 m^3 . The area of its base is 25 m^2 . Find its height.
11. Find the surface area of a sphere with:
 (a) radius 2.8 cm, (b) radius 13 m,
 (c) diameter 6.3 m, (d) diameter 11.2 m.
 Give each answer correct to the nearest whole unit.
12. Find the radius of a sphere whose surface area is
 (a) 154 cm^2 , (b) 2464 cm^2 .
13. Find the surface area of each of the following candles which is in the shape of a hemisphere with:
 (a) radius 10 cm, (b) diameter 5 m.
14. A cone has a height of 10 cm and a base radius of 6.5 cm. Calculate:
 (a) the area of its base, (b) the volume of the cone.
 Give each answer correct to 3 significant figures.
15. A cone has a height of 14 cm and a base radius of 4.2 cm. Calculate its volume. Give your answer correct to 1 decimal place.
16. Find the slant height of a cone whose base radius is 1.4 m and whose area of curved surface is 132 m^2 .
17. In a conical tent, the diameter of the base is 7 m and the slant height is 4.5 m. Calculate, correct to the nearest m^2 , the amount of material used for making this tent including the base.

18. A party hat is in the shape of a cone with a slant height of 20 cm. If the circumference of the base is 88 cm, calculate:
- the radius of the base,
 - the amount of paper used for making it. Give your answer in cm^2 .
19. An arc of a circle with radius 4.5 cm subtends an angle of 84° at the centre of the circle. Find the length of the arc. Give your answer correct to 1 decimal place.
20. A sector of a circle with radius 5 cm has an angle of 104° at the centre of the circle. Find the area of the sector. Give your answer correct to the nearest whole number.

21. The pendulum of a clock is 50 cm long. The pendulum bob swings from P to Q through an angle of 12° .
- What is the area of the sector covered by the pendulum as the bob swings from P to Q?
- Give your answer correct to 1 decimal place.



22. The hour hand of a clock sweeps through a sector with an area of 130 cm^2 in 5 hours. What is the length of the hour hand?
- Give your answer correct to the nearest whole number.
23. Vijay is planning his garden. The shaded area in the diagram represents a path.



Not to scale

AC and BD are arcs of circles whose centres are at O.
 $OC = 8 \text{ m}$ $CD = 2 \text{ m}$ Angle $BOD = 72^\circ$

Take π to be 3.14 or use the π key on your calculator.

- Calculate the area of the sector OAC.
- Calculate the area of the path.
- Vijay uses 1.2 m^3 of concrete to make the path. The depth of the concrete is the same over the whole path.

Calculate, in centimetres, the depth of the concrete.

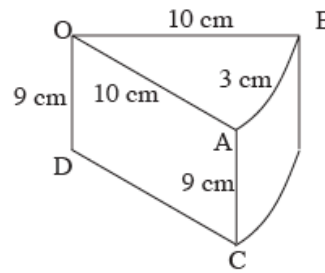
(SEG)

24. A cylindrical birthday cake is cut into pieces. One of the pieces is shown. O is the centre of the circle.

$$OD = 9 \text{ cm}$$

$$OA = OB = 10 \text{ cm}$$

$$\text{Arc length } AB = 3 \text{ cm}$$

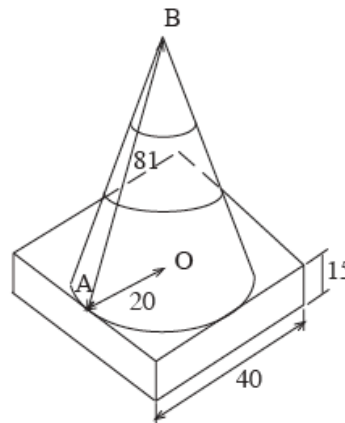


Not to scale

- Calculate the size of angle AOB.
Take π to be 3.14 or use the π key on your calculator.
- Calculate the area of the sector AOB.
- Calculate the total surface area of one of the pieces of cake.

(SEG)

25. A "TRAFFIC CONE" is made from a cone and a cuboid.
The cone has a radius $OA = 20 \text{ cm}$ and slant height $AB = 81 \text{ cm}$.
The cuboid has a square base, centre O, of side 40 cm and height 15 cm.

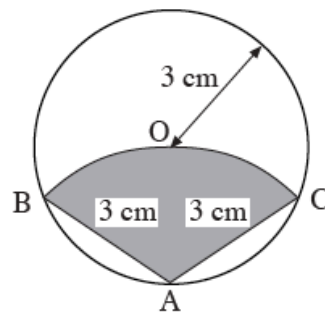
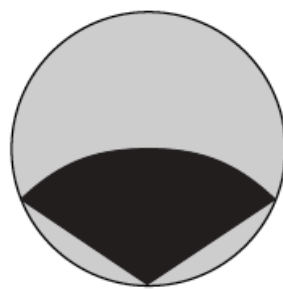


Not to scale

- How many planes of symmetry has the "TRAFFIC CONE"?
- Calculate the vertical height OB of the cone.
- Calculate the volume of the cone.
Take π to be 3.14 or use the π key on your calculator.
- Calculate the volume of the "TRAFFIC CONE".

(SEG)

26. A circular badge is shown. It consists of a circle centre O and radius 3 cm.
 The design on the badge is an arc BOC of a circle centre A and radius also 3 cm.
 The lines $OA = OB = OC = AB = AC = 3$ cm.



Not to scale

- Find the size of angle BAC .
- Find the area of the shaded sector $OBAC$.
 Take π to be 3.14 or use the π key on your calculator.
- The shaded sector $OBAC$ is to be painted red.
 The rest of the badge is to be painted yellow.
 Find the area that is to be painted yellow.



Not to scale

- The circles for the badges are cut out from square sheets of metal 50 cm by 50 cm as shown. What is the maximum number of badges that can be cut from the square?

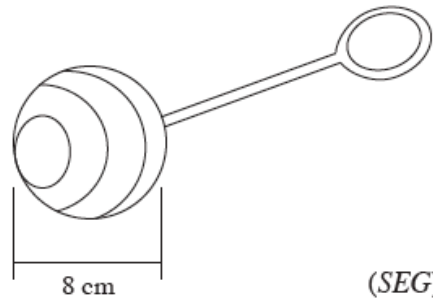
(SEG)

27. The head of a baby's rattle is a sphere.

The sphere has a diameter of 8 cm.

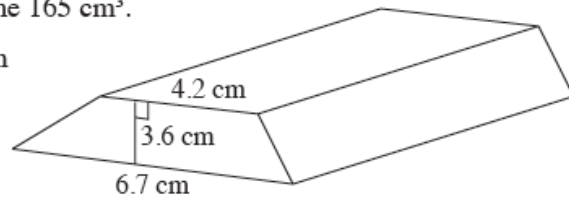
Calculate the volume of the sphere.

Take π to be 3.14 or use the π key on your calculator.



28. A bar of gold is a prism with volume 165 cm^3 .

Its cross-section is a trapezium with dimensions as shown.

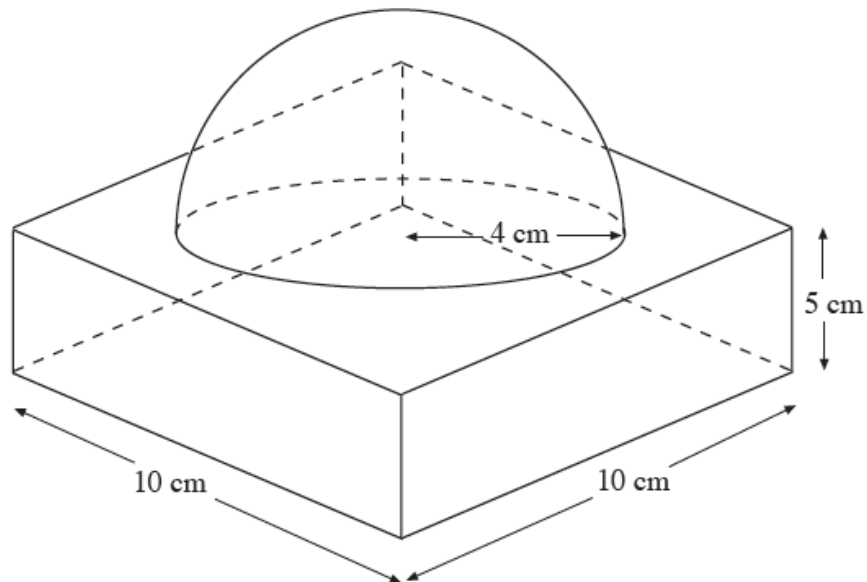


- (a) Calculate the length of the gold bar.
- (b) A similar bar of gold has a volume of 675.84 cm^3 . Calculate the height of this bar of gold.
- (c) A different bar of gold has a volume given by the formula $V = h^2 y$. Rearrange the formula to make h the subject.

(OCR)

29. A marble paperweight consists of a cuboid and a hemisphere as shown in the diagram.

The hemisphere has a radius of 4 cm.



Calculate the volume of the paperweight.

(AQA)