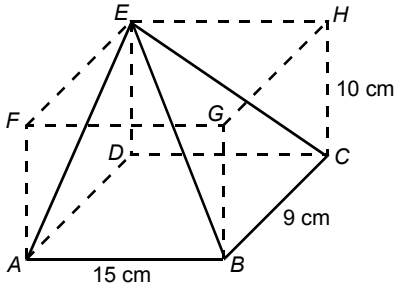


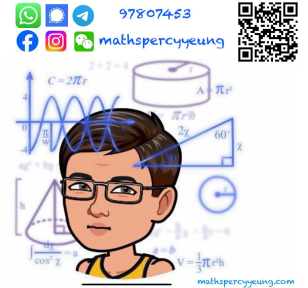
Chapter 8 Mensuration

Multiple Choice Section

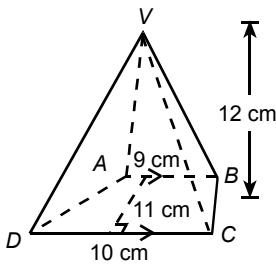
1. $ABCDEFGH$ is a cuboid of length 15 cm, width 9 cm and height 10 cm. DE is the height of pyramid $ABCDE$. Find the volume of the pyramid.



- A. 375 cm^3 B. 450 cm^3 C. 675 cm^3 D. $1\,350 \text{ cm}^3$

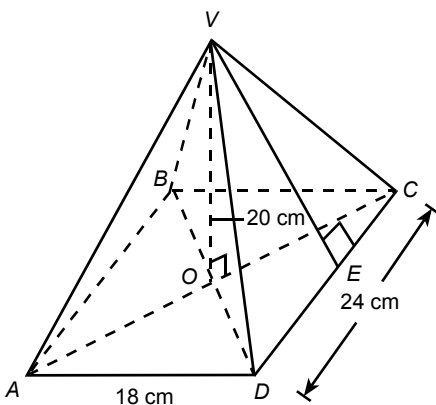


2. The figure shows a right pyramid with trapezium base $ABCD$. Find the volume of the right pyramid.



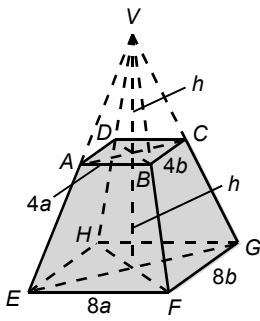
- A. 418 cm^3 B. 832 cm^3 C. $1\,664 \text{ cm}^3$ D. $2\,496 \text{ cm}^3$

3. In the figure, $VABCD$ is a right pyramid of height 20 cm and the base is a rectangle of dimensions 18 cm \times 24 cm. Find the length of VE . (Correct your answer to 1 decimal place.)



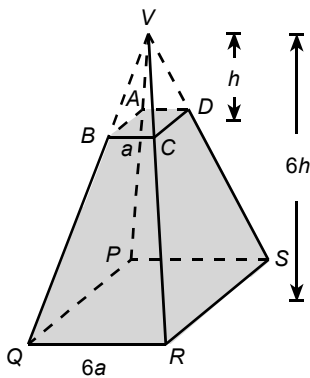
- A. 21.9 cm B. 23.3 cm C. 25.0 cm D. 28.4 cm

4. In the figure, the top and the base of the right frustum are rectangles. Find the volume of the frustum.



- A. $\frac{127}{3}abh$ B. $\frac{112}{3}abh$ C. $150abh$ D. It cannot be found.

5. In the figure, the top and the base of the right frustum are squares of sides a and $6a$ respectively. If the height of the original right pyramid is $6h$ and the height of the removed right pyramid is h , find $\frac{\text{volume of the frustum}}{\text{volume of pyramid } VPQRS}$.

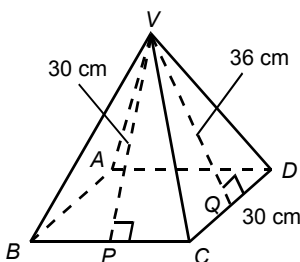


- A. $\frac{1}{64}$ B. $\frac{63}{64}$ C. $\frac{7}{8}$ D. $\frac{215}{216}$

6. The base of a right pyramid is a square. If the total surface area of the pyramid is 420 cm^2 and the area of one of its lateral faces is 56 cm^2 , find the base area of the pyramid.

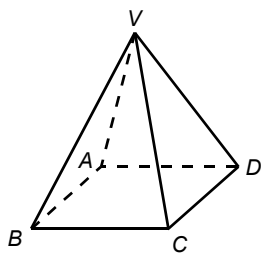
- A. 84 cm^2 B. 105 cm^2 C. 196 cm^2 D. 364 cm^2

7. The figure shows the right pyramid $VABCD$ with a rectangular base. If the total surface area of the right pyramid $VABCD$ is 4320 cm^2 , $CD = 30 \text{ cm}$, $VP = 30 \text{ cm}$ and $VQ = 36 \text{ cm}$, find the length of BC .



- A. 54 cm B. 63 cm C. 72 cm D. 108 cm

8. In the figure, the total surface area of the right pyramid $VABCD$ is 408 cm^2 . If the area of the square base is 144 cm^2 , find the height of the right pyramid. (Correct your answer to 3 significant figures.)

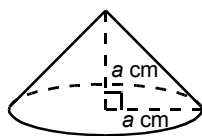
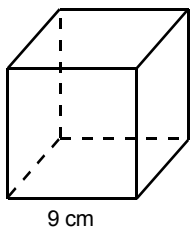


- A. 4.79 cm B. 9.22 cm C. 9.219 cm D. 12.5 cm

9. The base radius of a right circular cone is 10 cm and its slant height is 11 cm. Find the volume of the right circular cone. (Correct your answer to 1 decimal place.)

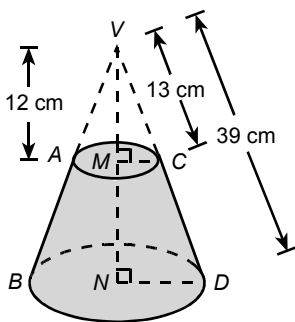
- A. 230.4 cm^3 B. 479.9 cm^3 C. 691.2 cm^3 D. $1\,151.9 \text{ cm}^3$

10. In the figure, the volumes of the cube and the right circular cone are the same. Find the value of a . (Correct your answer to 1 decimal place.)



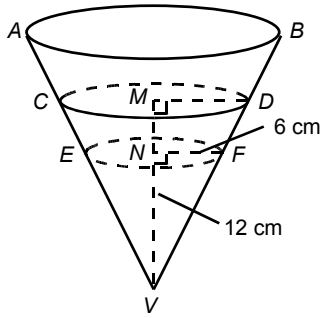
- A. 26.7 B. 9.0 C. 8.9 D. 3.0

11. In the figure, the top and the base of the right frustum are circles. Find the volume of the frustum.



- A. $2\,500\pi \text{ cm}^3$ B. $2\,600\pi \text{ cm}^3$ C. $2\,700\pi \text{ cm}^3$ D. $2816\frac{2}{3}\pi \text{ cm}^3$

12. In the figure, the inverted right circular cone is filled with water of depth 12 cm. If 380 cm^3 of water is added, find the rise in water level in the cone. (Correct your answer to 1 decimal place.)



- A. 0.6 cm B. 1.2 cm C. 2.7 cm D. 6.3 cm

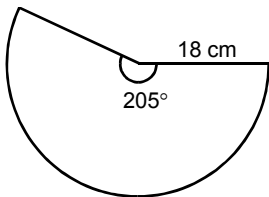
13. The base radius and the slant height of a right circular cone are 15 cm and 18 cm respectively. Find the curved surface area of the right circular cone.

- A. $270\pi \text{ cm}^2$ B. $540\pi \text{ cm}^2$ C. $900\pi \text{ cm}^2$ D. $4\,050\pi \text{ cm}^2$

14. A right circular cone has a base diameter of 18 cm and height 12 cm. Find the curved surface area of the right circular cone.

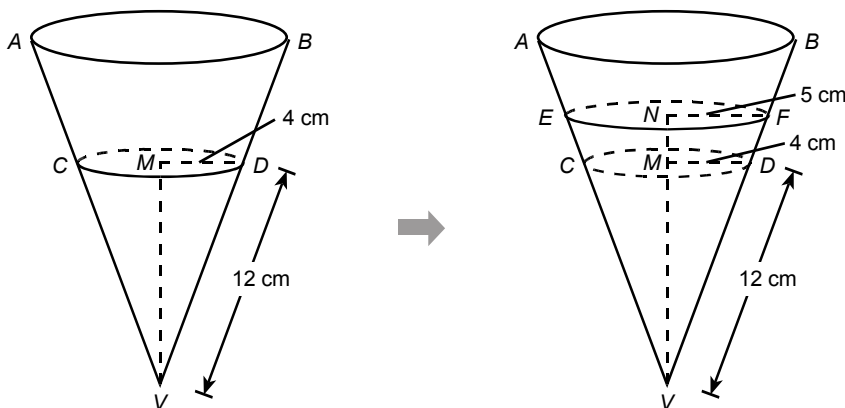
- A. $135\pi \text{ cm}^2$ B. $180\pi \text{ cm}^2$ C. $270\pi \text{ cm}^2$ D. $300\pi \text{ cm}^2$

15. In the figure, the sector is rolled up to form a right circular cone. Find the base radius of the circular cone.



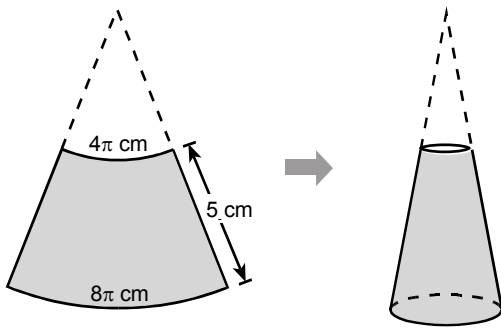
- A. 92.25 cm B. 18 cm C. 13.6 cm D. 10.25 cm

16. In the figure, the right conical cup is filled with water. If some water is added, find the increase in the area of the wet surface.



- A. $9\pi \text{ cm}^2$ B. $27\pi \text{ cm}^2$ C. $54\pi \text{ cm}^2$ D. $183\pi \text{ cm}^2$

17. As shown in the figure, a right frustum is formed by rolling up the paper. Find the curved surface area of the frustum.



- A. $10\pi \text{ cm}^2$ B. $20\pi \text{ cm}^2$ C. $30\pi \text{ cm}^2$ D. $40\pi \text{ cm}^2$

18. Find the surface area of a hemisphere of radius 9 cm.

- A. $81\pi \text{ cm}^2$ B. $162\pi \text{ cm}^2$ C. $243\pi \text{ cm}^2$ D. $324\pi \text{ cm}^2$

19. The outer diameter of a hollow metallic sphere is 22 cm and its thickness is 3 cm. Find the volume of the metal.

- A. $228\pi \text{ cm}^3$ B. $1092\pi \text{ cm}^3$ C. $2048\pi \text{ cm}^3$ D. $5052\pi \text{ cm}^3$

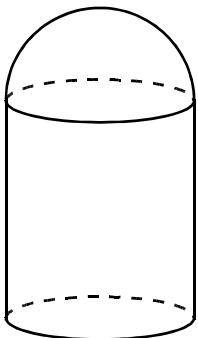
20. Two identical hemispheres of radii 2 cm are combined to form a sphere. Find the percentage change in the surface area.

- A. 0% B. $-33\frac{1}{3}\%$ C. -50% D. +50%

21. The ratio of the surface area and the volume of a sphere is 3 : 8. Find the radius of the sphere.

- A. 8 B. 3 C. $\frac{8}{3}$ D. $\frac{3}{8}$

22. In the figure, the ratio of the volume of a hemisphere and a cylinder is 3 : 5. Find the base radius of the cylinder : the height of the cylinder.



- A. 9 : 10 B. 5 : 3 C. 4 : 3 D. 3 : 5

23. The radii of three metallic spheres are 4 cm, 5 cm and 6 cm respectively. If they are melted and recasted into a new sphere, find the percentage change in the surface area. (Correct your answer to 1 decimal place.)
- A. 0% B. +29.0% C. -28.9% D. -92.2%

24. The ratio of the volumes of two cubes is 216 : 64. Find the ratio of their sides.
- A. 3 : 2 B. 36 : 16 C. 216 : 64 D. $\sqrt{216}$: 8

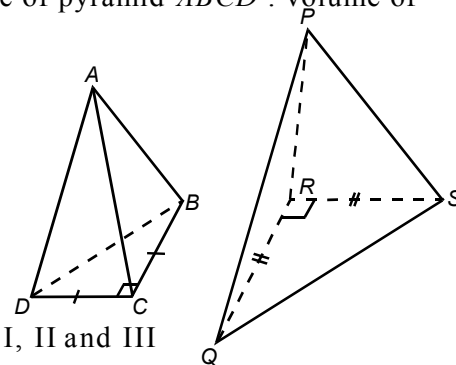
25. The ratio of the surface areas of two similar solids is 25 : 36. Find the ratio of their volumes.
- A. 5 : 6 B. 6 : 11 C. 25 : 36 D. 125 : 216

26. The figure shows two similar right triangular pyramids. If the volume of pyramid $ABCD$: volume of pyramid $PQRS = 8 : 27$, which of the following is / are correct?

- I. Area of $\triangle BCD$: Area of $\triangle QRS = 4 : 9$
 II. Area of $\triangle ABC$: Area of $\triangle PQR = 4 : 9$
 III. $AC : PR = 4 : 9$

- A. I only B. III only C. I and II only

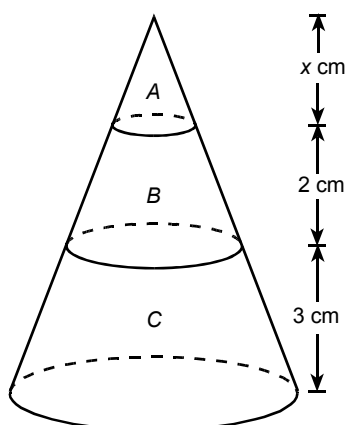
- D. I, II and III



27. The volume of a metallic sphere is 268 cm^3 . If it is melted and recasted into three spheres and the ratio of the radii of these three spheres is 1 : 2 : 5, find the volume of the largest metallic sphere.
- A. 2 cm^3 B. 16 cm^3 C. 125 cm^3 D. 250 cm^3

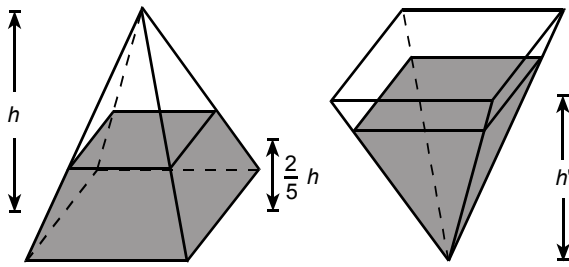
28. If the volume of a spherical balloon increases by 119.7%, find the percentage change in its surface area.
- A. +19.7% B. +30% C. +69% D. +119.7%

29. In the figure, a right circular cone is divided into 3 portions A , B and C by planes parallel to the base. The ratio of the curved surface areas of portions B and C is 2 : 5. Find the value of x .



- A. 1 B. 2.5 C. 2.75 D. 3

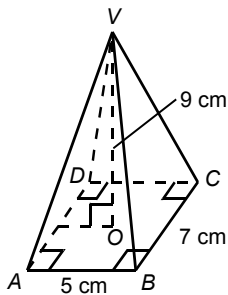
30. A right pyramid vessel of height h and with a square base is filled with water. The depth of water is $\frac{2}{5}h$. If the right pyramid vessel is inverted, the depth of water becomes h' . Find h' . (Express your answer in terms of h .)



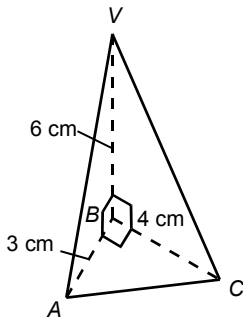
- A. $\frac{\sqrt[3]{98}}{5}h$ B. $\frac{\sqrt[3]{17}}{5}h$ C. $\frac{2}{5}h$ D. $\frac{3}{5}h$

Section A(1)

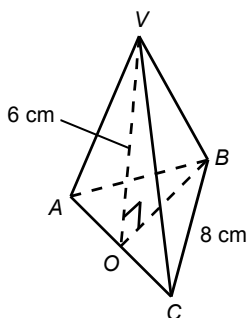
1. Find the volume of the following right pyramid.



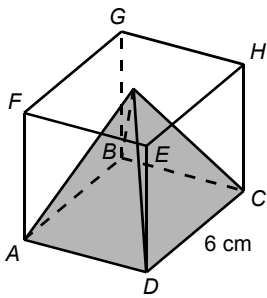
2. Find the volume of the following pyramid.



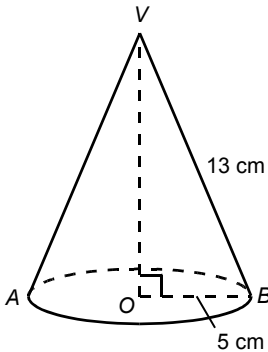
3. The figure shows the pyramid $VABC$ of height 6 cm and its base is an equilateral triangle of sides 8 cm. If O is the mid-point of AC , find the volume of the pyramid. (Correct your answer to 3 significant figures.)



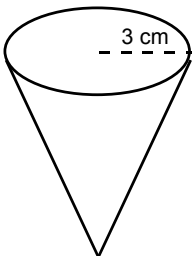
- The base area of a pyramid is 72 cm^2 and its volume is 360 cm^3 . Find the height of the pyramid.
- The figure shows a cubical box with a right pyramid just fits inside it. Find the volume of the empty space left in the cubical box.



- In the figure, the right circular cone has a base radius of 5 cm and slant height 13 cm.



- Find its curved surface area.
 - Find its volume.
- (Express your answers in terms of π .)
- The figure shows a right conical cup of base radius 3 cm. If it is fully filled with water, the area of the wet surface is 100 cm^2 .

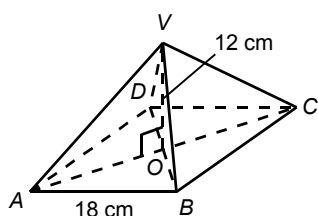


- Find the height of the cup.
 - Find the volume of the water.
- (Correct your answers to 3 significant figures.)
- Find the volume and surface area of a sphere of diameter 18 cm. (Express your answers in terms of π .)
 - The volume of air inside a volleyball is 3600 cm^3 . Find the inner radius of the volleyball. (Correct your answer to 2 significant figures.)
 - If the surface area of a sphere is $36\pi \text{ cm}^2$, find the radius and volume of the sphere. (Express your answers in terms of π if necessary.)
 - If the volume of a sphere is $36\pi \text{ cm}^3$, find the radius and surface area of the sphere. (Express your answers in terms of π if necessary.)
 - If the corresponding sides of two similar triangles are 4 cm and 6 cm respectively, find the ratio of the area of the small triangle to that of the large triangle.

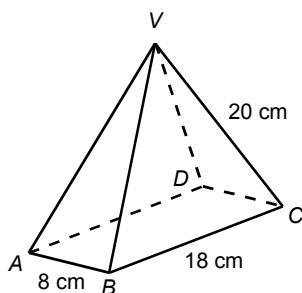
13. If the volumes of two similar spheres are 8cm^3 and 216cm^3 respectively, find the ratio of the surface area of the small sphere to that of the large sphere.
14. The height of a pyramid is 3 cm and the volume is 270cm^3 . What is the volume of a similar pyramid of height 5 cm?
15. The painting cost of a spherical container A is \$120. If the radius of a similar container B is 1.5 times as long as the radius of container A, what is the painting cost of container B?
16. Eight metallic spheres of radius 2 cm are melted and recasted into a large metallic sphere. Find the radius of the large metallic sphere.

Section A(2)

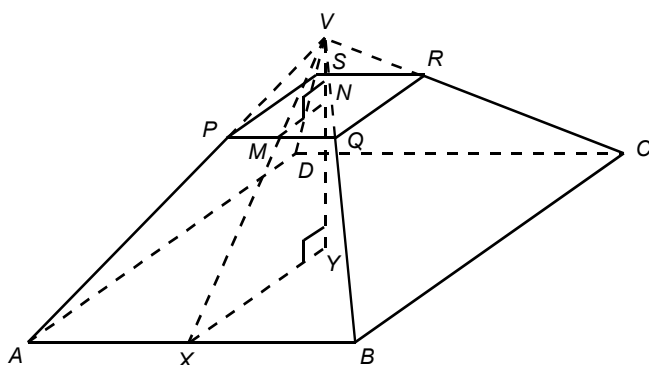
17. The volume of a square-based right pyramid is 36cm^3 and the length of each side of the square is 4 cm.
 - (a) Find the height of the pyramid.
 - (b) Find the length of each slant edge of the pyramid. (Correct your answer to 3 significant figures.)
18. The height of a right pyramid is 12 cm and the base is a square of sides 18 cm.



- (a) Find its volume.
 - (b) Find its total surface area.
 - (c) Find the length of each slant edge. (Correct your answer to 1 decimal place.)
19. The base of the right pyramid $VABCD$ is a rectangle, where $AB = 8\text{ cm}$ and $BC = 18\text{ cm}$. If the length of each slant edge of the pyramid is 20 cm, find the total surface area of the pyramid. (Correct your answer to 1 decimal place.)

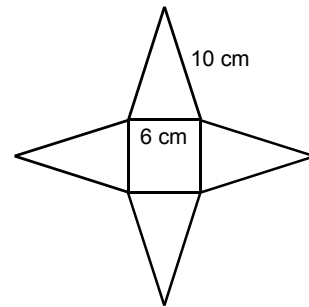


20. The figure shows a square-based right frustum, where $AB = 12\text{ cm}$, $PQ = 4\text{ cm}$ and $NY = 4\text{ cm}$.



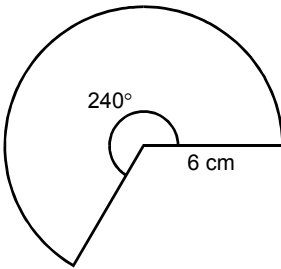
- (a) By considering similar triangles VXY and VMN , find the height of the pyramid $VABCD$.
 (b) Hence, find the volume of frustum $ABCDSPQR$.

21. The figure shows the net of a right pyramid with a square base.

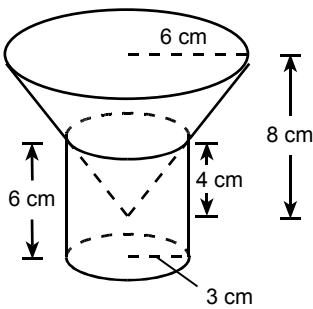


- (a) Find the total surface area of the pyramid.
 (b) Find the height of the pyramid.
 (c) Find the volume of the pyramid.
 (Correct your answers to 3 significant figures.)

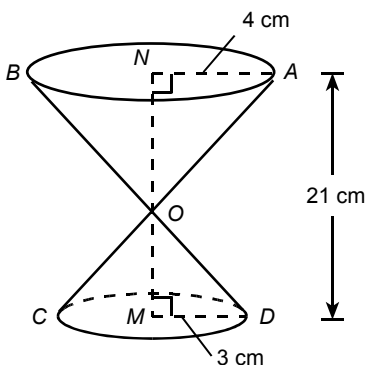
22. If the sector as shown in the figure is rolled up to form a right circular cone, find the base radius and the volume of the cone. (Correct your answers to 3 significant figures if necessary.)



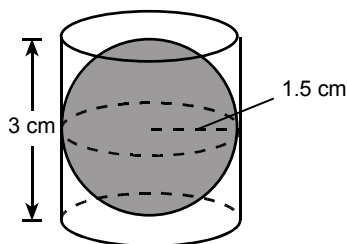
23. The figure shows a solid formed by a right cylinder and a right frustum. Find the volume of the solid. (Express your answer in terms of π .)



24. A sand-glass of height 21 cm is composed of 2 similar right circular cones. The base radius of the circular cone on the top is 4 cm and the base radius of the circular cone at the bottom is 3 cm. Find the total capacity of the sand-glass. (Correct your answers to the nearest cm^3 .)

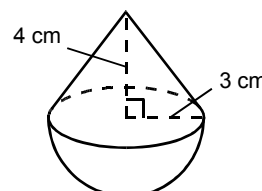


25. A sphere of radius 1.5 cm just fits into a cylindrical container of radius 1.5 cm and height 3 cm. Find the volume of the empty space left inside the container. (Express your answer in terms of π .)



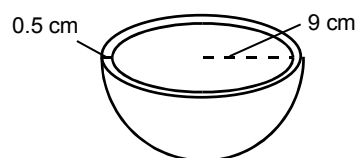
26. The figure shows a solid which is composed of a right circular cone and a hemisphere. The base radius and height of the right circular cone are 3 cm and 4 cm respectively.

- (a) Find the volume of the solid.
 (b) Find the total surface area of the solid.
 (Express your answers in terms of π .)



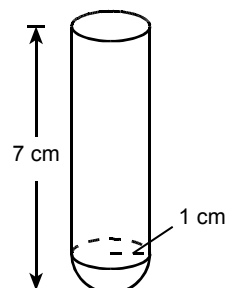
27. The figure shows a hemispherical copper bowl of inner radius 9 cm and thickness 0.5 cm. If the density of copper is 9 g per cm^3 ,

- (a) find the total surface area of the copper bowl.
 (b) find the weight of the copper bowl.
 (Correct your answers to 3 significant figures.)

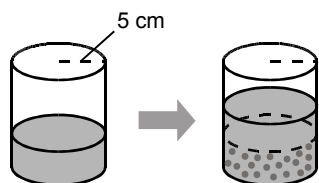


28. The figure shows a solid of height 7 cm. It is composed of a hemisphere and a cylinder with base radius 1 cm.

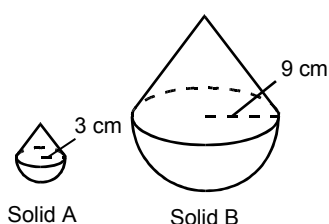
- (a) Find the volume of the solid.
 (b) Find the total surface area of the solid.
 (Express your answers in terms of π .)



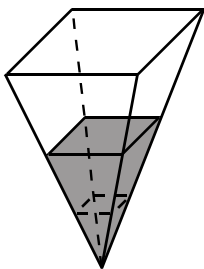
29. A cylinder of base radius 5 cm is filled with water. If 100 metallic spheres of radius 1 cm are submerged into the water and there is no overflow of water, find the rise in water level in the cylinder. (Correct your answer to 3 significant figures.)



30. The figure shows two similar solids A and B. Each of them is composed of a right circular cone and a hemisphere. The base radii of the cone of solid A and solid B are 3 cm and 9 cm respectively. Find the ratio of the volume of solid A to that of solid B.

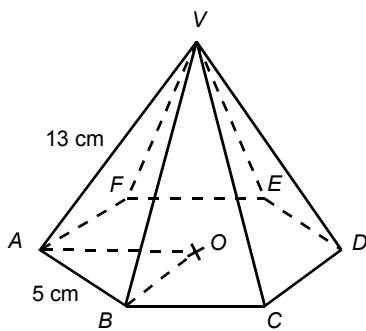


31. The surface area of a spherical soap bubble increases by 21%.
- Find the percentage increase in its radius.
 - Find the percentage increase in its volume.
32. $1\,000\text{ cm}^3$ of water is poured into an inverted right pyramid vessel with a square base and the area of the wet surface is 40 cm^2 . If $7\,000\text{ cm}^3$ of water is added, find the increase in the area of the wet surface.

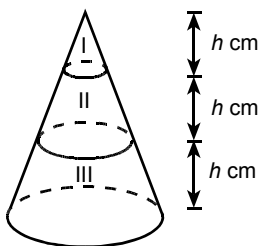


Section B

33. The figure shows the right pyramid $VABCDEF$, where O is the centre of the regular hexagonal base $ABCDEF$.



- Find the area of $\triangle OAB$.
 - Find the area of $\triangle VAB$.
 - Find the total surface area of the right pyramid $VABCDEF$.
 - Find the volume of the right pyramid $VABCDEF$.
- (Correct your answers to 3 significant figures.)
34. In the figure, the right circular cone is divided into three portions I, II and III by planes parallel to the base. The heights of portions I, II and III are all $h\text{ cm}$.



- Find the ratio of the volumes of portions I, II and III.
- If the volume of portion III is 190 cm^3 , find the volumes of portion I and portion II.