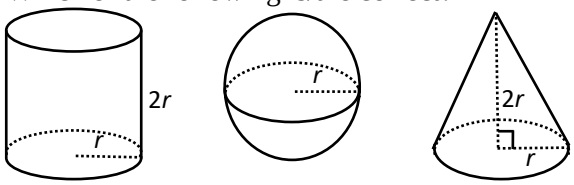
TB(3B) Ch.7 Areas & Volumes (III)
Multiple Choice Questions

1. [16-17 Standardized Test, 8]

In the figure, a cylinder, a sphere and a right circular cone, each of which has radius r and height $2r$, are given. Let A_1, A_2 and A_3 be the total surface areas of the cylinder, the sphere and the cone respectively. Which of the following is/are correct?

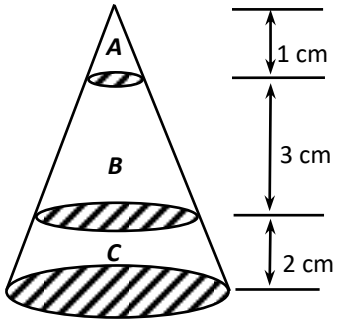


I. $A_1 = A_2$
II. $A_2 > A_3$
III. $A_1 : A_2 : A_3 = 2 : 4 : 3$

A. II only
B. I and II only
C. II and III only
D. I, II and III

2. [16-17 Standardized Test, 9]

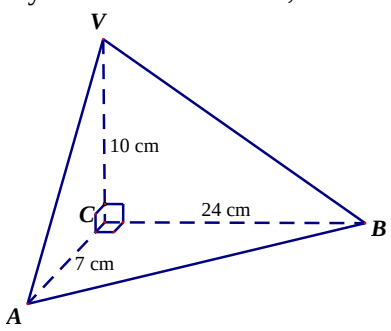
In the figure, a right circular cone is cut horizontally into 3 parts. Part A is a cone, part B and part C are circular frustums. Find the ratio of the curved surface areas of parts $A : B : C$.



A. 1 : 3 : 2
B. 1 : 9 : 4
C. 1 : 15 : 20
D. 1 : 16 : 36

3. [16-17 Mid-year Exam, 10]

In the figure, $VABC$ is a right-angled triangular pyramid where V is vertically above C. AC = 7 cm, BC = 24 cm and VC = 10 cm. Find the volume of $VABC$.



A. 280 cm^3
B. 420 cm^3
C. 560 cm^3
D. 840 cm^3

4. [16-17 Mid-year Exam, 16]

If the total surface area of a right circular cone with a base radius of 3 cm is 24π cm^2, the volume of the cone is

A. 12π cm^3.

B. 15π cm^3.

C. 24π cm^3.

D. 36π cm^3.

5. [16-17 Mid-year Exam, 17]

The height of a circular cone is the same as its base radius. If the volume of the circular cone increases by 20%, the percentage change of its total surface area is

A. – 36 %.

B. + 6.27%.

C. + 12.9%.

D. + 44%.

6. [16-17 Final Exam, 14]

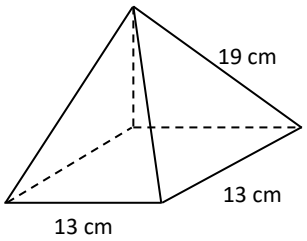
If the radius of a larger sphere is 20% longer than that of a smaller sphere, then by what percent is the surface area of the larger sphere greater than that of the smaller sphere?

A. 20% **B.** 40%
C. 44% **D.** 72.8%

7. [16-17 Final Exam, 15]

In the figure, find the total surface area of the right pyramid with square base correct to 3 significant figures.

A. 529 cm^2
B. 633 cm^2
C. 663 cm^2
D. 1100 cm^2



8. [17-18 Mid-year Exam, 11]

The base of a pyramid is a right-angled isosceles ΔABC with $\angle ABC = 90°$ and the height of the pyramid is 8 cm. If the volume of the pyramid is 48 cm^3, find the length of AB.

A. 3 cm

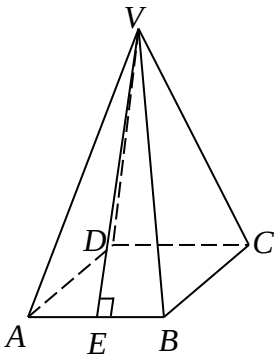
B. $3\sqrt{2}$ cm

C. 6 cm

D. $6\sqrt{2}$ cm

9. [17-18 Mid-year Exam, 20]

In the figure, *VABCD* is a solid right pyramid. *ABCD* is a rectangle with $AB = \frac{20}{3}$ cm and $BC = 12$ cm. The height *VE* of ΔVAB is 10 cm. Find the total surface area of the pyramid.



A. $\frac{512}{3}$ cm^2

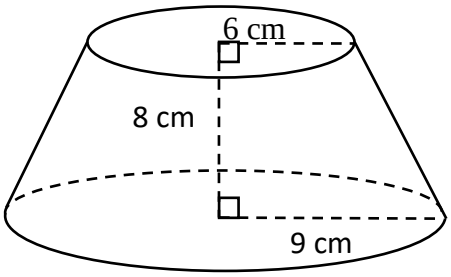
B. $\frac{560}{3}$ cm^2

C. $\frac{752}{3}$ cm^2

D. $\frac{800}{3}$ cm^2

10. [17-18 Standardized Test 2, 9]

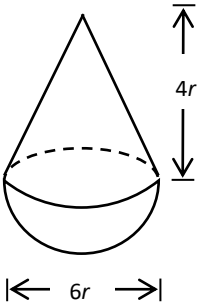
The base radii of the upper and lower bases of a right circular frustum are 6 cm and 9 cm respectively. The height of the frustum is 8 cm. Find the volume of the frustum.



A. 296π cm^3
B. 456π cm^3
C. 888π cm^3
D. 1368π cm^3

11. [17-18 Standardized Test 2, 10]

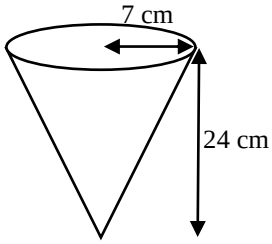
The solid in the figure consists of a right circular cone and a hemisphere. Find the total surface area of the solid in terms of π and r.



A. $21\pi r^2$
B. $30\pi r^2$
C. $33\pi r^2$
D. $51\pi r^2$

12. [17-18 Final Exam, 5]

If a paper cone of base radius 7 cm and height 24 cm is cut along a slant edge and unfolded into a sector, find the angle of the sector.



A. 28.224°
B. 100.8°
C. 105°
D. 109.375°

13. [17-18 Final Exam, 6]

It is given that the volume of a sphere is $288\pi\ \text{cm}^3$, find the surface area of the sphere.

A. $144\pi\ \text{cm}^2$
B. $288\pi\ \text{cm}^2$
C. $576\sqrt{2}\pi\ \text{cm}^2$
D. $864\pi\ \text{cm}^2$

14. [17-18 Final Exam, 16]

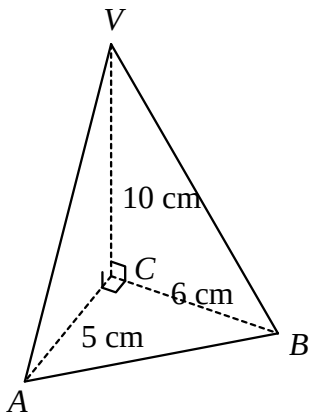
Find the volume of a triangular prism with all lengths of edges $\sqrt{3}$.

A. $\frac{3\sqrt{3}}{4}$
B. $\frac{9}{4}$
C. $\frac{3\sqrt{15}}{4}$
D. $3\sqrt{3}$

15. [18-19 Mid-year Exam, 7]

In the figure, *VABC* is a triangular pyramid with *AC* = 5 cm, *BC* = 6 cm and *VC* = 10 cm. Find its volume.

A. 50 cm^3
B. 100 cm^3
C. 150 cm^3
D. 300 cm^3



16. [18-19 Standardized Test 2, 4]

a, *b* and *c* are linear measurements of a solid. Which of the following is a possible formula for the volume of the solid?

A. $a^2\sqrt{b^2+c^2}$

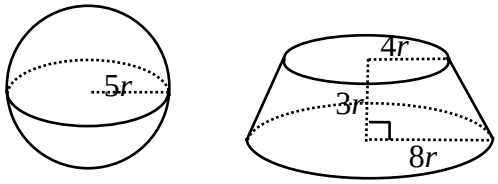
B. $4\pi a^2$

C. $\sqrt{(a-b)^2+c^2}$

D. $ab+c^2$

17. [18-19 Standardized Test 2, 10]

The figure show a sphere with radius 5*r* and a frustum of right circular cone with lower base radius 8*r*, upper base radius 4*r* and height 3*r*. Let A_1, A_2 be the total surface areas of the sphere and the frustum respectively, and V_1, V_2 be the volumes of the sphere and the frustum respectively. Which of the following are correct?



I. $A_1 : A_2 = 5:7$

II. $V_1 > V_2$

III. If the sphere is cut into two identical hemispheres, the new total surface area is larger than A_2.

A. I and II only **B.** I and III only

C. II and III only **D.** I, II and III

18. [18-19 Final Exam, 8]

When a solid sphere with radius 6 cm is split into two hemispheres, find the total surface area.

A. 108π cm^2

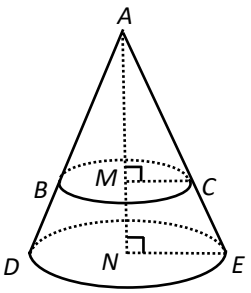
B. 144π cm^2

C. 180π cm^2

D. 216π cm^2

19. [18-19 Final Exam, 17]

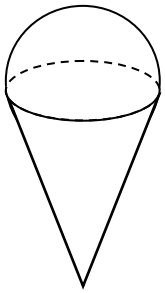
If $AM : MN = 3 : 2$, find the ratio of the volume of the cone ABC to the volume of the frustum $BCED$.



A. 3 : 1
B. 9 : 5
C. 27 : 19
D. 27 : 98

20. [20-21 Standardized Test, #6]

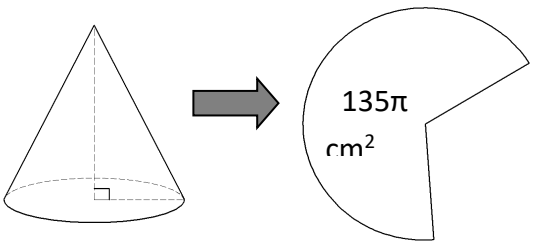
The figure shows a solid consisting of a hemisphere and a right circular cone with a common base of radius r cm. The height of the cone is h cm. If the volume of the hemisphere is the same as that of the cone, find the ratio $r : h$.



A. 1 : 4
B. 1 : 2
C. 2 : 1
D. 4 : 1

21. [20-21 Standardized Test, #7]

The figure shows a right conical paper cup. The ratio of the base radius to the height of the paper cup is 3 : 4. The paper cup is then cut along its slant height and flattened to form a sector of area 135π cm^2. Find the height of the paper cup.



A. 3 cm
B. 9 cm
C. 12 cm
D. 15 cm

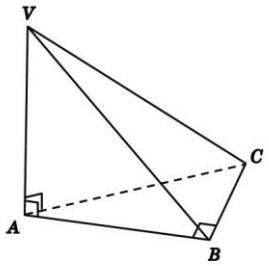
22. [20-21 Standardized Test, #8]

A sphere is expanded so that the volume is increased by 100%. Find the percentage increase in the curved surface area of the sphere.

A. 21.5%
B. 26.0%
C. 41.4%
D. 58.7%

23. [20-21 Final Exam, #8]

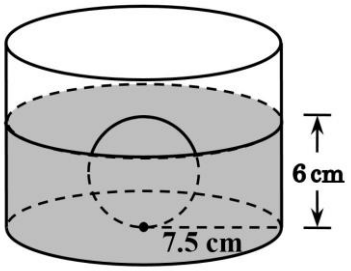
In the figure, *VABC* is a pyramid with *VA* = 9 cm, *VB* = 15 cm and *BC* = 5 cm. Find the volume of the pyramid *VABC*.



A. 90 cm^3
B. 112.5 cm^3
C. 180 cm^3
D. 270 cm^3

24. [20-21 Final Exam, #17]

In the figure, a steel sphere is put into a cylindrical container of base radius 7.5 cm. The water surface just covers the sphere and the depth of water is 6 cm. Find the original depth of water before putting the sphere into the container.



A. 0.64 cm
B. 0.88 cm
C. 4.8 cm
D. 5.36 cm