Areas & Volumes
Multiple Choice Questions

1. [13-14 Standardized Test 2, 5]

It is given that the heights of two pyramids are both 30 cm. The difference between their volumes is 30 cm^3. Find the difference in their base areas.

A. 1 cm^2 **B.** 3 cm^2
C. 6 cm^2 **D.** 9 cm^2

2. [13-14 Standardized Test 2, 8]

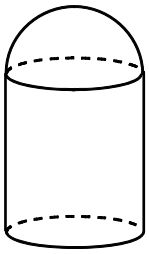
The total surface area of a hemisphere with radius r cm is 30 cm^2. Find the surface area of a sphere with radius $2r$ cm.

A. 60 cm^2 **B.** 80 cm^2
C. 120 cm^2 **D.** 160 cm^2

3. [13-14 Standardized Test 2, 10]

The given solid is formed by a hemisphere and a cylinder. If the ratio of the radius of the hemisphere to the height of the cylinder is 1 : 3, find the ratio of the volume of the hemisphere to that of the cylinder.

A. 1 : 9
B. 2 : 9
C. 1 : 27
D. 2 : 27



4. [13-14 S6 Mock Exam , 11]

Frustums A and B are similar. If the ratio of upper base areas of A to B is 64 : 729, find the ratio of volumes of A to B.

A. 4 : 9
B. 8 : 27
C. 16 : 81
D. 512 : 19683

5. [13-14 Final Exam , 8]

What is the dimension of $m\pi\sqrt{(2m)^2+n^2}$, where m and n are linear measurments?

A. 0 **B.** 1
C. 2 **D.** 3

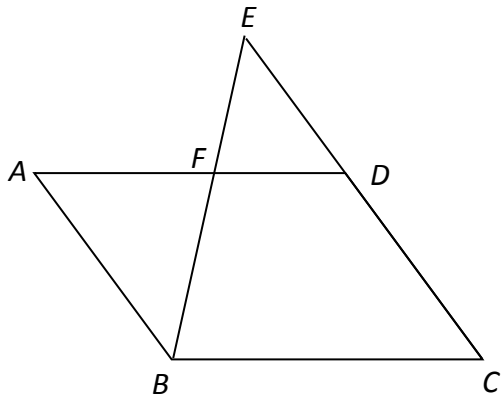
6. [13-14 Final Exam , 20]

A spherical container of radius 6 cm is fully filled with water. Mary pours all the water into a cylindrical container of base radius 4 cm. If the cylindical container is just filled up, then its curved surface area is

A. 72 cm^2 . **B.** 72π cm^2 .
C. 144 cm^2 . **D.** 144π cm^2 .

7. [13-14 S.5 Final Exam , 42]

In the figure, *ABCD* is a parallelogram. *F* is a point lying on *AD*. *BF* produced and *CD* produced meet at *E*. If *CD* : *DE* = 3 : 1, then *AF* : *BC* =



A. 1 : 3 .
B. 2 : 3 .
C. 3 : 4.
D. 4 : 5.

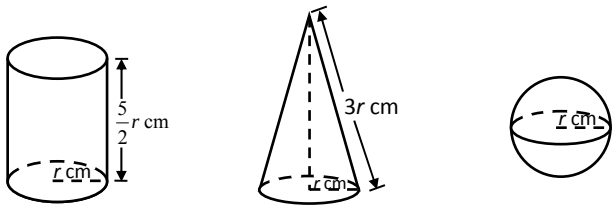
8. [14-15 Standardized Test, 2]

A hollow cylindrical metal pipe, 1 m long, has an external radius and an internal radius of 5 cm and 4 cm respectively. The volume of metal is

A. 10π cm^3 . **B.** 90π cm^3 .
C. 100π cm^3 . **D.** 900π cm^3 .

9. [14-15 Standardized Test, 3]

The figure shows a right circular cylinder, a right circular cone and a sphere. Their curved surface areas are X cm^2, Y cm^2 and Z cm^2 respectively. Which of the following is true?



A. Y < Z < X
B. Z < Y < X
C. Z < X < Y
D. X < Y < Z

10. [14-15 Standardized Test, 10]

A solid metal sphere of volume 504 cm^3 is melted and recast into 3 smaller solid spheres whose curved surfaces are in the ratio $1:4:9$. The volume of the medium sphere is

A. $14\,\text{cm}^3$.
B. $36\,\text{cm}^3$.
C. $112\,\text{cm}^3$.
D. $144\,\text{cm}^3$.

11. [14-15 Final Exam, 9]

The formula $b^m\sqrt{a^2+c^n}$ represents the total surface area of a solid where a, b and c are linear measurements of the object, m and n are constants. Which of the following are the possible values of m and n?

A. $m = 1, n = 1$
B. $m = 1, n = 2$
C. $m = 2, n = 1$
D. $m = 2, n = 2$

12. [14-15 Final Exam, 21]

If the base radius of a right circular cone is increased by 30% and slant height is decreased by 40%, then the percentage increase in its curved surface area is

A. –78%. **B.** –22%.
C. –10%. **D.** 78%.

13. [15-16 Mid-year Exam, 7]

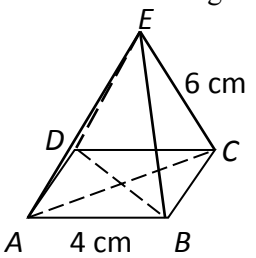
The base area of a pyramid is 120 cm^2 and the height is 10 cm. If the pyramid is melted and recast into a triangular prism with base area 80 cm^2. Find the percentage change in height from pyramid to prism.

A. 100% **B.** 50%
C. –50% **D.** –100%

14. [15-16 Mid-year Exam, 8]

The figure shows a right pyramid with a square base of side 4 cm and its slant height is 6 cm. Find the total area of all lateral faces.

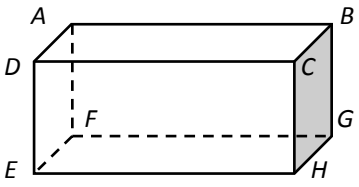
A. 22.6 cm^2
B. 45.3 cm^2
C. 61.3 cm^2
D. 90.5 cm^2



15. [15-16 Standardized Test, 3]

If the volume of cuboid *ABCDEFGH* is a^3 cm^3, find the volume of pyramid *ADEFH*.

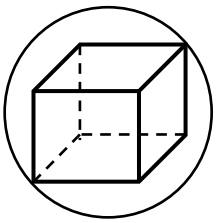
A. $\frac{a}{3}$ cm^3 **B.** $\frac{a}{2}$ cm^3
C. $\frac{a^3}{3}$ cm^3 **D.** $\frac{a^3}{8}$ cm^3



16. [15-16 Standardized Test, 10]

A cube can just be fitted into a sphere of radius $\frac{r}{2}$ so that all the vertices of the cube touch the sphere.

Find the length of a side of the cube.

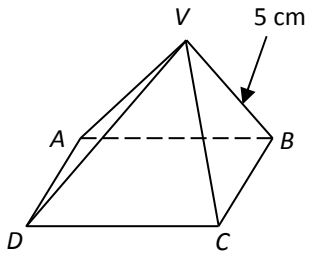


A. $\frac{\sqrt{3}}{6}r$ **B.** $\frac{\sqrt{2}}{4}r$

C. $\frac{\sqrt{3}}{3}r$ **D.** $\frac{2\sqrt{3}}{3}r$

17.[15-16 Final Exam, 6]

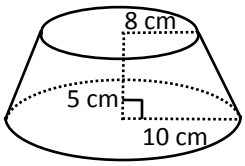
In the figure, *VABCD* is a right pyramid with a square base *ABCD* of area 36 cm^2 and the slant height is 5 cm. The total surface area of the pyramid is



A. 48 cm^2.
B. 60 cm^2.
C. 72 cm^2.
D. 84 cm^2.

18. [15-16 Final Exam, 26]

In the figure, the radii of the upper and lower bases of a frustum are 8 cm and 10 cm respectively. Find the total surface area of the frustum, correct to 3 significant figures.



A. 261 cm^2
B. 515 cm^2
C. 820 cm^2
D. 1280 cm^2

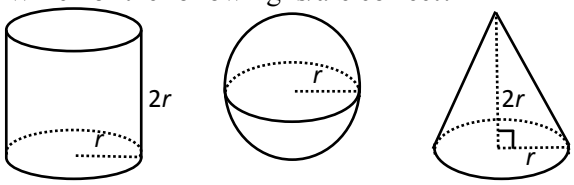
19. [15-16 Final Exam, 19]

What is the dimension of the measurement $\pi x^2 + \pi x\sqrt{4x^2 + y^2}$ if x and y are linear measurements?

A. 1 **B.** 2
C. 3 **D.** 4

20. [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?

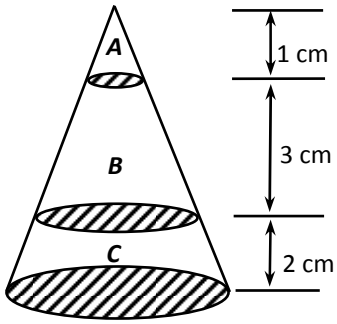


I. $A_1 = A_2$
II. $A_2 > A_3$
III. $A_1 : A_2 : A_3 = 2 : 4 : 3$

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

21. [16-17 Standardized Test, 9]

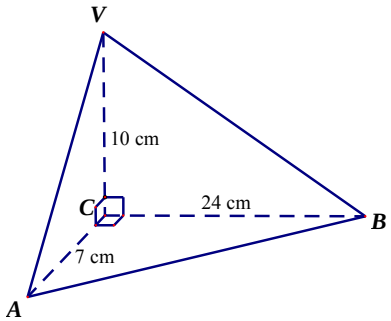
In the figure, a right circular cone is cut horizontally into 3 parts. Part *A* is a cone, part *B* and part *C* are circular frustums. Find the ratio of the curved surface areas of parts *A* : *B* : *C*.



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

22. [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

23. [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.

24. [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%.

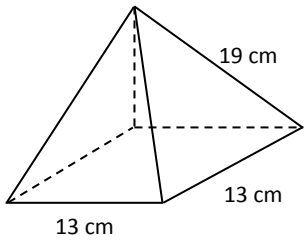
25. [16-17 Final Exam, 14]

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%

26. [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

27. [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

28. [17-18 Mid-year Exam, 20]

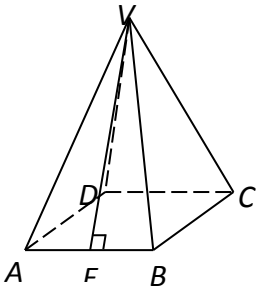
In the figure, $VABCD$ is a solid right pyramid. $ABCD$ is a rectangle with $AB = \frac{20}{3}$ cm and $BC = 12$ cm. The height VE of ΔVAB is 10 cm. Find the total surface area of the pyramid.

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

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

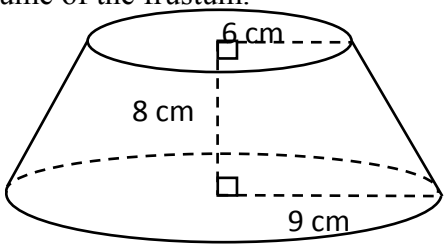
C. $\frac{752}{3}$ cm^2

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



29.[17-18 Standardized Test 2, 9]

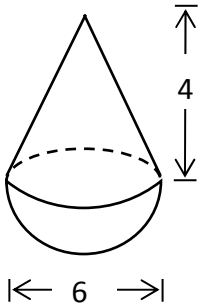
The base radii of the upper and lower bases of a right circular frustum are 6 cm and 9 cm respectively. The height of the frustum is 8 cm. Find the volume of the frustum.



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

30. [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. $21\pi r^2$

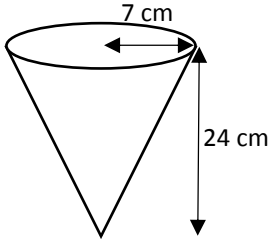
B. $30\pi r^2$

C. $33\pi r^2$

D. $51\pi r^2$

31. [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°

32. [17-18 Final Exam, 6]

It is given that the volume of a sphere is 288π cm^3, find the surface area of the sphere.

A. 144π cm^2

B. 288π cm^2

C. $576\sqrt{2}\pi$ cm^2

D. 864π cm^2

33. [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. $3\sqrt{3}$