

Area, Surface Area & Volume

Foundation to Challenge

Practice should make the test feel easier, not merely familiar.

Work without the answer key first. Check answers through the SAT Practice Library after completing the set.

FOUNDATION

- 1 What is the volume of a cube with surface area 216 square inches?

- 2 What is the surface area of a cube with volume 1728 cubic inches?

- 3 A right circular cylinder has radius 5 and height 7. What is its total surface area?

- A. 60π
- B. 100π
- C. 120π
- D. 140π

STANDARD

- 4 Two solid spheres of radius 1.5 in are placed in a $4 \times 6 \times 7$ in rectangular tank. To nearest tenth, what volume of water can the tank hold?

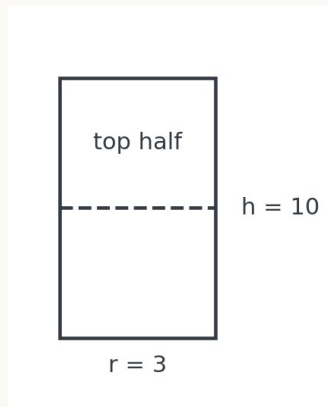
ADVANCED

- 5 A cube has edge 60. A sphere inside touches all six faces. Using $\pi = 3.14$, approximately what volume of the cube is not occupied by the sphere?

A. 102,960
 B. 112,940
 C. 120,000
 D. 216,000

FOUNDATION

- 6 A cylinder of radius 3 and height 10 is sliced by a horizontal plane halfway up. What is the volume of the top piece?



Axial cross-section; the cut is halfway up.

A. 18π
 B. 30π
 C. 45π
 D. 90π

STANDARD

- 7 A box has square base area 36 and volume 180. How much material is needed to cover all six faces?

ADVANCED

- 8 A brick is 8 in long, width 25 % greater than length, and height 3 in shorter than length. Mass is 8,000 g. What is density in $\frac{g}{in^3}$?

STANDARD

- 9 A cylinder has volume $864\pi cm^3$. Spherical balls of radius 3 cm are used. Ignoring packing gaps, how many ball-volumes equal the cylinder volume?

ADVANCED

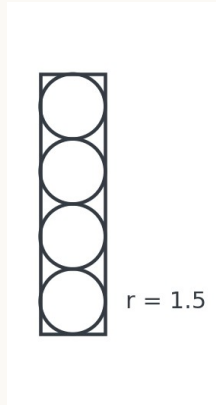
- 10 A $12 \times 6 \times 2m$ pool is full. One-third of its water goes into cones of radius 1.5 m and height 2 m. Using $\pi = 3.14$, what minimum number of cones is needed?

STANDARD

- 11 A cube has volume $216m^3$. A cylinder has the same height and same volume. If radius is $k/\sqrt{\pi}$, what is k ?
- A. 4
B. 6
C. 8
D. 12

FOUNDATION

- 12** A cylinder is just large enough to fit 4 tennis balls of radius 1.5 in stacked vertically. What is cylinder volume?



Axial cross-section of four balls in a cylinder.

- A. 54π
- B. 36π
- C. 27π
- D. 72π

STANDARD

- 13** A cylinder and cube have equal volume and equal height h . What is the cylinder radius?

- A. $h/\sqrt{\pi}$
- B. $h\sqrt{\pi}$
- C. h/π
- D. h^2/π

ADVANCED

- 14** The height of a cylinder is 3 times its circumference C . What is volume in terms of C ?

- A. $\frac{3C^3}{4\pi}$
- B. $\frac{3C^2}{4\pi^2}$
- C. C^3/π
- D. $\pi \frac{C^3}{4}$

STANDARD

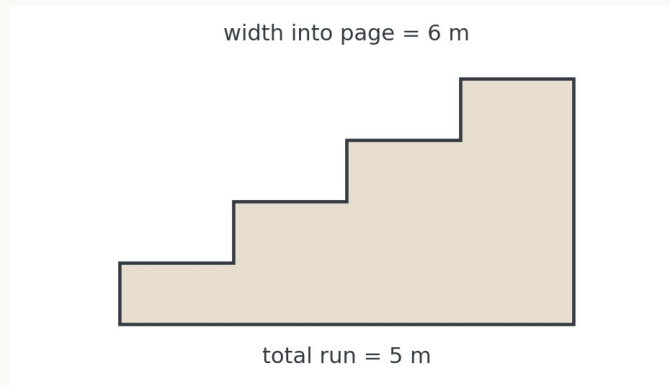
- 15** A cone has volume $12\pi a^4$ and height $4a^2$. What is the base radius? Assume $a > 0$.
- A. $a\sqrt{3}$
 - B. $3a$
 - C. $3a^2$
 - D. $6a$

ADVANCED

- 16** A crate has outside dimensions $12 \times 10 \times 4$ cm. Floor and four walls are 1 cm thick and it has no lid. What interior volume can it hold?
- A. 160
 - B. 180
 - C. 200
 - D. 240

CHALLENGE

- 17** A solid four-step model has a 6 m by 5 m base. Each rise is 0.25 m and each tread depth is 1.25 m. If the model material has density 80 kg/m^3 , what is its mass?



Side view: each tread is 1.25 m and each rise is 0.25 m.

- A. 1350
- B. 1500
- C. 1650
- D. 1800

FINISHED?

Check your answers online

aryalanupme.github.io/sat-area-surface-volume.html

Do not stop at “wrong.” Identify why it was wrong: concept, algebra, arithmetic, interpretation, calculator choice, or timing.

I do not correct the answer first. I correct the reason.

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