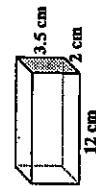


Part I: Surface Area

1. What is the surface area of the given prism?



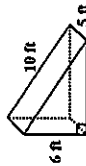
- A 130 cm²
- B 132 cm²
- C 139 cm²
- D 146 cm²

2. Find the surface area of the cylinder below.



- A 60π cm²
- B 71π cm²
- C 80π cm²
- D 100π cm²

3. Determine the surface area of the given prism.

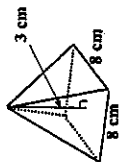


- A 112 ft²
- B 120 ft²
- C 144 ft²
- D 168 ft²

4. What is the surface area of a sphere with a diameter of 10? (SA = $4\pi r^2$)

- A 50π units²
- B 100π units²
- C 200π units²
- D 300π units²

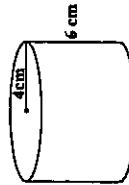
5. Determine the surface area of a square pyramid if $s = 8$ cm and $h = 3$ cm.



- A 24 cm²
- B 96 cm²
- C 112 cm²
- D 144 cm²

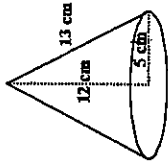
Part II: Volume

6. Find the volume of the cylinder below?



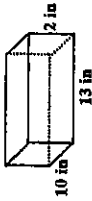
- A 24π cm³
- B 48π cm³
- C 96π cm³
- D 384π cm³

7. What is the volume of the given cone?



- A 40π cm³
- B 100π cm³
- C $\frac{130\pi}{3}$ cm³
- D $\frac{325\pi}{3}$ cm³

8. Determine the volume of the prism below.

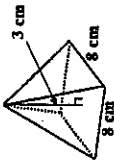


- A 50 in³
- B 176 in³
- C 260 in³
- D 352 in³

9. A pyramid has a volume of 250 cm³. What would be the volume of a rectangular prism with the same base and same height as the pyramid?

- A $83\frac{1}{3}$ cm³
- B 125 cm³
- C 500 cm³
- D 750 cm³

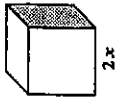
10. What is the volume of the square pyramid?



- A 48 cm³
- B 64 cm³
- C 192 cm³
- D 320 cm³

Part III: Changes in Dimensions

11. If the edges of a cube are *doubled*, which statement *must* be true about the volume of the two cubes?

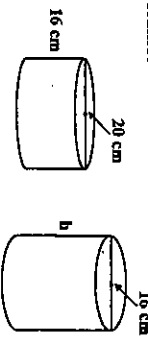


- A the volume is doubled
- B the volume of the cubes are in a ratio of 1:2
- C the volume of the cubes are in a ratio of 1:3
- D the volume of the cubes are in a ratio of 1:8

12. The ratio of surface areas of two similar cones is 9:16. What is the ratio of the volumes of the cones?

- A 3:4
- B 9:16
- C 27:64
- D 81:256

3. A cylindrical can is 20 cm in diameter and 16 cm in height. You want to reduce the diameter of the can to 16 cm. What must the height be if the new can still has the same volume?

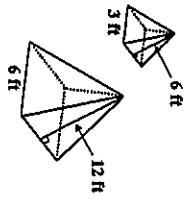


- A 20 cm
B 25 cm
C 200 cm
D 250 cm

4. The surface area of a sphere is 200 cm^2 . If the radius of another sphere were three times as large as the first sphere, what would be the surface of the other sphere? ($SA = 4\pi r^2$)

- A 200 cm^2
B 600 cm^2
C 1200 cm^2
D 1800 cm^2

5. The two pyramids below are similar. If the surface area of the first pyramid is 45 ft^2 , what is the surface area of the second pyramid?



- A 180 ft^2
B 270 ft^2
C 360 ft^2
D 545 ft^2

Part IV: Application

16. Find the amount of insulation needed to cover the sides (lateral area) of the 40-gallon hot water heater with diameter of 20 inches and height of 50 inches. (Use 3.14 for π)



- A 3,140 in^2
B 3,354 in^2
C 3,768 in^2
D 15,700 in^2

17. A classroom is 30 feet long, 24 feet wide, and 10 feet high. If each person in the room needs 300 cubic feet of air, what is the maximum capacity of the room?

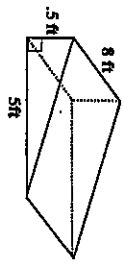
- A 24 people
B 240 people
C 2400 people
D 7200 people

18. A machinist drilled a conical hole into a cube of metal as shown. If the cube has sides of length 6 cm, what is the volume of the metal after the hole is drilled? (Use 3.14 for π)



- A 46.4 cm^3
B 56.5 cm^3
C 159.5 cm^3
D 160.6 cm^3

19. Julie owns a sandwich shop. She needs to build a handicapped ramp outside the front curb of her shop. The ramp shown below is a triangular prism.



Julie is going to have the ramp made of cement. If each cement bag makes 2 cubic feet of cement mix, how many bags of cement are needed to fill the ramp?

- A 5 bags
B 10 bags
C 40 bags
D 100 bags

20. An ice cream cone is 8 cm deep and has a diameter of 6 cm. A spherical scoop of ice cream that is 6 cm in diameter rests on top of the cone. If all the ice cream melts into the cone, will the cone overflow? Explain. (Sphere: $V = \frac{4}{3}\pi r^3$)

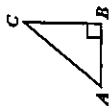


- A No, the volume of the ice cream is less than the volume of the cone.
B No, the volume of the ice cream is exactly equal to the volume of the cone.
C Yes, the volume of the ice cream is greater than the volume of the cone.
D Yes, the volume of the ice cream is exactly equal to the volume of the cone.

Part V: Short Answer

21. Briefly explain how you know that an obtuse triangle cannot be similar to a right triangle. (4 pts)

22. In the given right triangle $m\angle B = 90^\circ$ and $\sin A = \frac{5}{13}$.



• What does the $\cos A$ equal? Justify your solution. (4 pts)

23. The length of the bases of an isosceles trapezoid is 6 cm and 12 cm. The length of each leg is 5 cm.

• Make a drawing, include all measurements. (1 pt)

• What is the area of the trapezoid? Justify your solution. (3 pts)

24. Given the following circle with the inscribed square.



• What is the area of the shaded region? Justify your solution. (4 pts)

25. One end of a ramp is raised to the back of a truck 1 meter above the ground. The length of the ramp is 2 meters.



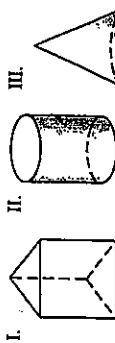
• What is the measure of the angle the ramp makes with the ground? Briefly explain your solution. (4 pts)

Standardized Test Practice

For use with pages 719-726

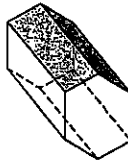
TEST TAKING STRATEGY Work as quickly as you can through the easier sections, but avoid making careless errors on easy questions.

1. Multiple Choice Which of the figures shown is not a polyhedron?



- (A) I only
- (B) II only
- (C) III only
- (D) I and II
- (E) II and III

2. Multiple Choice The polyhedron below has how many faces (F) and edges (E)?



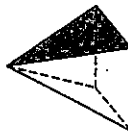
- (A) F = 6, E = 18
- (B) F = 6, E = 24
- (C) F = 8, E = 18
- (D) F = 8, E = 24
- (E) F = 8, E = 30

3. Multiple Choice The polyhedron below has how many vertices?



- (A) 14
- (B) 15
- (C) 16
- (D) 17
- (E) 18

4. Multiple Choice The solid below is best described as a

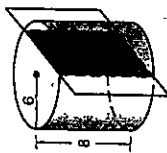


- (A) convex, regular polyhedron.
- (B) convex, nonregular polyhedron.
- (C) nonconvex, regular polyhedron.
- (D) nonconvex, nonregular polyhedron.
- (E) none of these

5. Multiple Choice Use Euler's Theorem to find the number of faces when a polyhedron has 8 vertices and 12 edges.

- (A) 4
- (B) 6
- (C) 8
- (D) 10
- (E) 12

6. Multiple Choice Which is the best description of the cross section of the figure shown?



- (A) circle
- (B) square
- (C) rectangle
- (D) oval
- (E) pentagon

7. Multiple Choice The name of the regular polyhedron shown is



- (A) tetrahedron.
- (B) octahedron.
- (C) cube.
- (D) dodecahedron.
- (E) icosahedron.

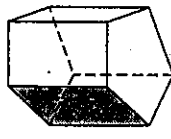
8. Quantitative Comparison Choose the statement below that is true.

- (A) The value in column A is greater.
- (B) The value in column B is greater.
- (C) The two values are equal.
- (D) The relationship cannot be determined from the given information.

Column A	Column B
The number of vertices on a solid with 15 faces, having 9 hexagons and 6 squares	The number of vertices on a solid with 22 faces, having 16 squares and 6 triangles

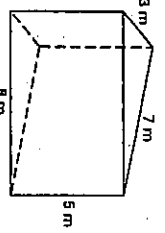
TEST TAKING STRATEGY Make sure that you are familiar with the directions before taking a standardized test. This way, you do not need to worry about the directions during the test.

1. **Multiple Choice** The best mathematical name of the solid is
- (A) right prism.
 - (B) right rectangular prism.
 - (C) cube.
 - (D) right pentagonal prism.
 - (E) right hexagonal prism.

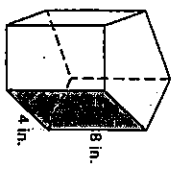


2. **Multiple Choice** How many lateral edges does the figure in Exercise 1 have?
- (A) 4
 - (B) 5
 - (C) 7
 - (D) 15
 - (E) 10

3. **Multiple Choice** Find the lateral area of the right prism shown.
- (A) 105 m^2
 - (B) 90 m^2
 - (C) 85 m^2
 - (D) 74 m^2
 - (E) 114 m^2

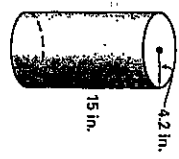


4. **Multiple Choice** Find the surface area of the regular right prism.
- (A) 215 in.^2
 - (B) 160 in.^2
 - (C) 105 in.^2
 - (D) 187.5 in.^2
 - (E) 270 in.^2

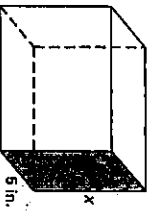


5. **Multiple Choice** Find the surface area of a right rectangular prism with a height of 6 inches, a length of 2 inches, and a width of 8 inches.
- (A) 96 in.^2
 - (B) 120 in.^2
 - (C) 152 in.^2
 - (D) 128 in.^2
 - (E) 56 in.^2

6. **Multiple Choice** Find the surface area of the right cylinder. Round to the nearest hundredth.
- (A) 831.27 in.^2
 - (B) 252 in.^2
 - (C) 395.84 in.^2
 - (D) 506.68 in.^2
 - (E) 451.26 in.^2



7. **Multiple Choice** Use the diagram to solve for the value of x given that the surface area of the figure is 286 in.^2 .
- (A) 14 in.
 - (B) 12 in.
 - (C) 6 in.
 - (D) 8
 - (E) 8

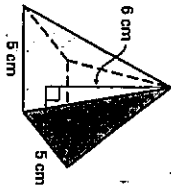


- Quantitative Comparison** In Exercises 8 and 9, use the solids to choose the statement below that is true.
- (A) The value in column A is greater.
 - (B) The value in column B is greater.
 - (C) The two values are equal.
 - (D) The relationship cannot be determined from the given information.

	Column A	Column B
8.		
9.	Lateral area	Lateral area

TEST TAKING STRATEGY If you are not satisfied with your SAT score, remember that you can take it again.

For Exercises 1–3, use the diagram below.

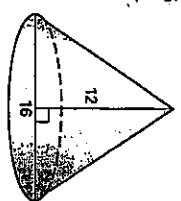


1. **Multiple Choice** Find the slant height of the pyramid.
- (A) 4.5 cm
 - (B) 5.5 cm
 - (C) 6.5 cm
 - (D) 6 cm
 - (E) 7.8 cm

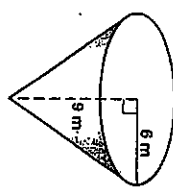
2. **Multiple Choice** Find the lateral area of the pyramid.
- (A) 57.5 cm^2
 - (B) 65 cm^2
 - (C) 32.5 cm^2
 - (D) 78 cm^2
 - (E) 90 cm^2

3. **Multiple Choice** Find the surface area of the pyramid.
- (A) 57.5 cm^2
 - (B) 65 cm^2
 - (C) 32.5 cm^2
 - (D) 78 cm^2
 - (E) 90 cm^2

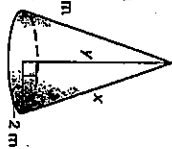
4. **Multiple Choice** Find the slant height of the cone. Round to the nearest tenth.
- (A) 20.0
 - (B) 10.6
 - (C) 8.9
 - (D) 14.4
 - (E) 7.1



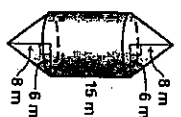
5. **Multiple Choice** Find the surface area of the cone. Round to the nearest tenth.
- (A) 317.0 m^2
 - (B) 241.7 m^2
 - (C) 239.4 m^2
 - (D) 278.2 m^2
 - (E) 452.4 m^2



6. **Multiple Choice** Use the diagram to solve for x and y when the surface area is 138.23 m^2 .
- (A) $x = 9.8 \text{ m}, y = 10 \text{ m}$
 - (B) $x = 11 \text{ m}, y = 10.8 \text{ m}$
 - (C) $x = 8 \text{ m}, y = 7.7 \text{ m}$
 - (D) $x = 10.8 \text{ m}, y = 10.6 \text{ m}$
 - (E) $x = 20 \text{ m}, y = 19.9 \text{ m}$



7. **Multiple Choice** Find the surface area of the solid. The cylinder and cones are right. Round to the nearest tenth.
- (A) 716.3 m^2
 - (B) 867.1 m^2
 - (C) 1168.7 m^2
 - (D) 1055.6 m^2
 - (E) 942.5 m^2



8. **Multi-Step Problem** A regular pyramid has a triangular base with a base edge of 6 inches, a height of 10 inches, and a slant height of 10.33 inches.
- a. Sketch the solid.
 - b. Find the lateral area.
 - c. Find the surface area.
 - d. Double the lengths of the base edge, height, and slant height. What is the ratio of the surface area of the smaller pyramid to the larger pyramid?