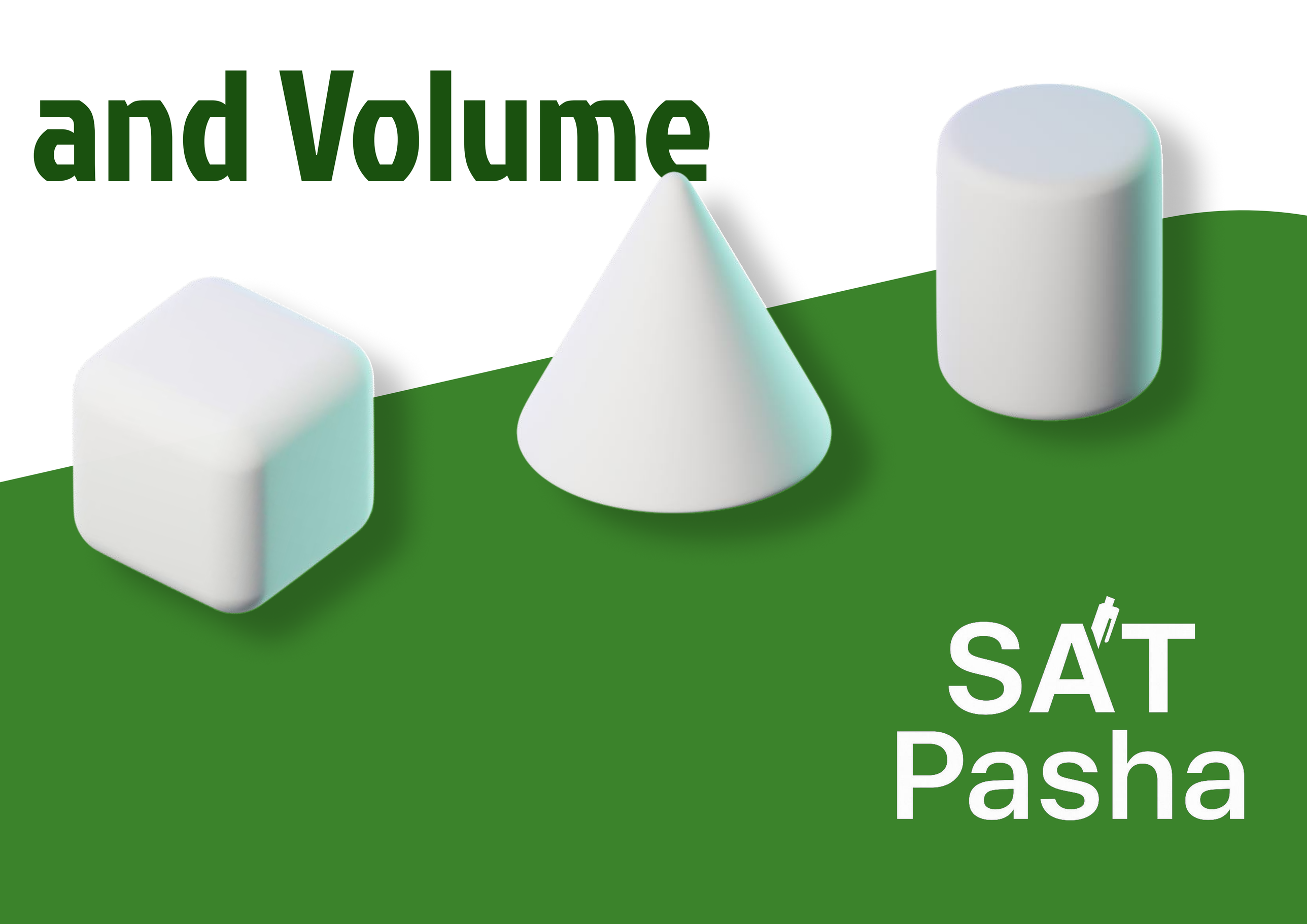
Geometry booster: Area and Volume



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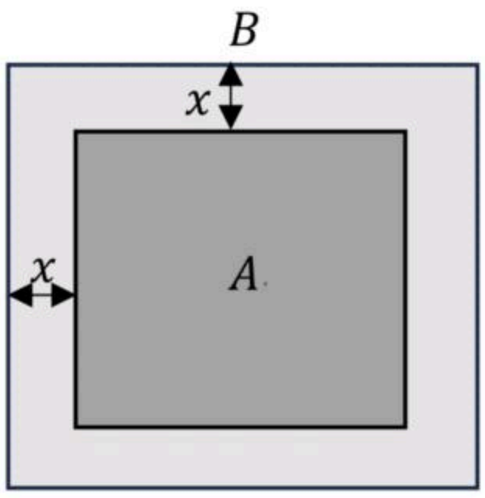
1.

Cylinder	Volume	Surface Area
A	$1{,}296\pi$	$k\pi$
B	$162{,}000\pi$	$j\pi$

The table gives the volume of two similar cylinders. If the radius of cylinder A is 9 cm. What is the value of $j - k$?

Volume $= \pi r^2 h$
Surface area $= 2\pi r^2 + 2\pi rh$

2. Rectangle A has a width of 50 feet and a length of 45 feet and is located inside rectangle B. A uniform distance x, in feet, separates the sides of rectangle A from rectangle B. The area of rectangle B is 2646 square feet, what is the value of x?



3. The table gives the volume and surface areas of two similar rectangles, where k is a constant.

	Volume (cubic inches)	Surface Area (square inches)
Rectangle A	4,374	1,782
Rectangle B	1,500,282	k

What is the value of k?

A) 5,346
B) 12,474
C) 87,318
D) 611,226

4. A cube-shaped box has each side measuring **120 centimeters**. The box is **open at the top** (no lid).
What is the **exterior surface area** of this box in **square meters?**

5. A right triangular pyramid has exactly six edges. Each edge measures **72 centimeters**.
If the surface area of the pyramid is written as $k\sqrt{3}$ square centimeters, what is the value of k?

6. A right triangular pyramid has exactly six edges. Each edge measures **85 centimeters**.
If the surface area of the pyramid is written as $k\sqrt{3}$ square centimeters, what is the value of k?

7. A lab cuts a **cube-shaped** mineral sample with edge length **4.50 cm**.
If the cube's mass is **218.7 g**, what is the **density** of the mineral in grams per cubic centimeter ?

8. To investigate soil properties, a cube-shaped soil sample was taken from a field. The edge length of the cube is 3.00 centimeters. If the mass of this cube is 60.75 grams,
what is the density of the soil sample in grams per cubic centimeter?

9. The steel pipe has an outside diameter of 56 inches, a wall thickness of 12 inches, and a height of 204 inches. Which of the followings is closest to the volume, in cubic inches, of the wall of this pipe?

10. The steel pipe has an outside diameter of 74 inches, a wall thickness of 8 inches, and a height of 164 inches. Which of the following is closest to the volume, in cubic inches, of the wall of this pipe?

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11. The steel pipe has an outside diameter of 64 inches, a wall thickness of 9 inches, and a height of 304 inches. Which of the following is closest to the volume, in cubic inches, of the wall of this pipe?

12. A right square pyramid has a height of 24 centimeters (cm). A second right square pyramid has a height of 48 centimeters. The area of the base of each of the two pyramids is 400 cm^2 . Which of the following is closest to the difference in the surface area of the second pyramid and the surface area of the first pyramid, in cm^2 ?

A)704
B)921
C)327
D)2024

13. A right square pyramid has a height of 26 centimeters (cm). A second right square pyramid has a height of 52 centimeters. The area of the base of each of the two pyramids is 324 cm^2 . Which of the following is closest to the difference in the surface area of the second pyramid and the surface area of the first pyramid, in cm^2 ?

A)909
B)750
C)627
D)1024

14. A right circular cone has a height of 13 centimeters (cm) and a base with a radius of 6 cm. What is the volume, in cm^3 , of this cone?

15. A right circular cone has a height of 23 centimeters (cm) and a base with a radius of 16 cm. What is the volume, in cm^3 , of this cone?

16. A right circular cone has a height of 35 centimeters (cm) and a base with a radius of 16 cm. What is the volume, in m^3 , of this cone?

17. A right circular cone has a height of 12 centimeters (cm) and a base with a radius of 5 cm. What is surface area, in cm^2 , of this cone?

18. A right circular cone has a height of 15 centimeters(cm) and a base with a radius of 8 cm. What is surface area in $k\pi$ cm^2, of this cone?

19. A right circular cone has a height of 28 centimeters(cm) and a base with a radius of 21 cm. What is surface area in $k\pi$ cm^2, of this cone?

20. A cube-shaped box has each side measuring **240 centimeters**. The box is **open at the top** (no lid).
What is the **exterior surface area** of this box in **square meters**?

21. A cylindrical **concrete pipe** has an **outside diameter of 150 cm**, a **wall thickness of 10 cm**, and a **height of 300 cm**.

1. Find the **volume of the wall** of this pipe in cubic centimeters.
2. If the density of concrete is 2.40 g/ cm^3 and, find the **mass of the pipe** in kilograms.

22. The length of square M is 7 times bigger than one side of square N. The area of the square N is 17 square centimeters. What is the area, in square centimeters, of square M?

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23. The height of a right-angular cylinder is 6 inches longer than its radius, and the surface are of the cylinder is 1080 square inches. What is the cylinder's radius, in inches?

24. To study fluctuations in the leaf water potential, samples of wood were taken from 48 trees and cut in the shape of a cube. The length of the edge of one of these cubes is 4.00 centimeters. If this cube has a mass of 4.23 grams, what is the density of this cube in grams per cubic centimeter?

25. A right rectangular prism has a base of 68p square centimeters (cm^2). The length of the rectangular prism is 17 cm, and the height of the rectangular prism is 9 cm. Which expression represents the surface area, in cm^2, of the right rectangular prism?

A)104p
B)208p+ 306
C)326
D)1024

26. Rectangle ABCD and EFGH are similar. The length of each side of EFGH is 7 times the length of the corresponding side of ABCD. The areas of ABCD are 215 square units. What is the area, in square units, of EFGH?

27. A hemisphere is half of a sphere. If a hemisphere has a radius of 80 inches, which of the following is closest to the volume of this hemisphere?

28. The circumference of the base of a right circular cylinder is 6 π, and the height of the cylinder is 19 meters. What is the volume, in cubic meters, of the cylinder?

29. A right circular cone has a height of 13 centimeters (cm) and a base with a radius of 6 cm. What is the volume, in cm^3, of this cone?

30. A sphere has a radius of 24 feet. What is the volume, in cubic feet, of the sphere?

31. The width of a rectangle is 5 centimeters. The length of the rectangle is 30 centimeters longer than the width. What is the area, in square centimeters, of this rectangle?

32. A triangular prism has a height of 3 centimeters (cm) and a volume of 60 cm^3.What is the area, in cm^2, of the base of the prism? (The volume of a triangular prism is equal to Bh, where B is the area of the base and h is the height of the prism.

33. To study fluctuations in leaf water potential, samples of wood were taken from 21 trees and cut in the shape of a cube. The length of the edge of one of these cubes is 3.000 centimeters. This cube has a density of 0.220 grams per cubic centimeter. What is the mass of this cube, in grams?

34. The points (0,15), (10,8), and (10,3) are shown in the xy - plane, where the x-axis and y-axis are measured in units. These points define one of the bases of a triangular prism. The distance between the two bases of the prism is 20 units. What is the volume, in cubic units, of the prism

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35. The points (0,25), (15,8), and (15,3) are shown in the xy - plane, where the x-axis, and y-axis are measured in units. These points define one of the bases of a triangular prism. The distance between the two bases of the prism is 20 units. What is the volume, in cubic units, of the prism

36. The points (0,22), (6,7), and (6,13) are shown in the xy-plane, where the x-axis and y-axis are measured in units. These points define one of the bases of a triangular prism. The distance between the two bases of the prism is 20 units. What is the volume, in cubic units, of the prism

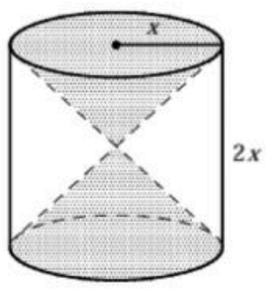
37. The points (0,22), (10,22) are shown in the xy-plane are the end points of the diameter of the circle, where the x-axis and y-axis are measured in units. These points define one of the bases of a circular right cylinder. The distance between the two bases of the cylinder is 20 units. What is the volume, in $k\pi$ cubic units, of the cylinder ?

38. The points (0,42), (12,42) are shown in the xy-plane are the end points of the diameter of the circle, where the x-axis and y-axis are measured in units. These points define one of the bases of a circular right cylinder. The distance between the two bases of the cylinder is 20 units. What is the volume, in $k\pi$ cubic units, of the cylinder ?

39. A right triangular prism has a base of 72p square centimeters (cm^2). The length of the rectangular prism is 12 cm, and the height of the rectangular prism is 7 cm. Which expression represents the surface area, in cm^2, of the right rectangular prism?

A)228p
B)228p+168
C)396
D)1048

40.

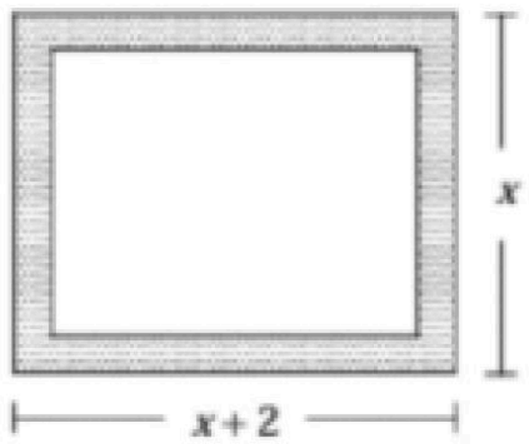


In the figure above, a double cone is inscribed in a cylinder whose radius is x and height is 2x. What is the volume of the space inside the cylinder but outside the double cone, in terms of x?

A) $\frac{1}{2}\pi x^3$
B) $\frac{3}{2}\pi x^3$
C) $\frac{4}{3}\pi x^3$
D) $\frac{3}{2}\pi x^3$

41. In triangle XY Z, angle Y is a right angle, the measure of angle Z is 41°, and the length of YZ is 44 units. If the area, in square units, of triangle XYZ can be represented by the expression k tan 41° , where k is a constant, what is the value of k?

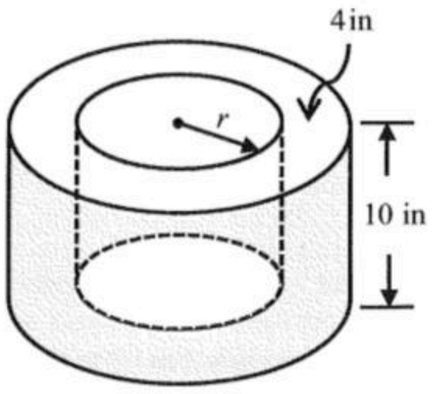
42.



A rectangular picture, represented by the unshaded region in the figure above, is mounted in a rectangular frame, represented by the shaded region. The frame is 1 inch wide on all sides. For what value of x, in inches, is the area of the picture twice the area of the frame?

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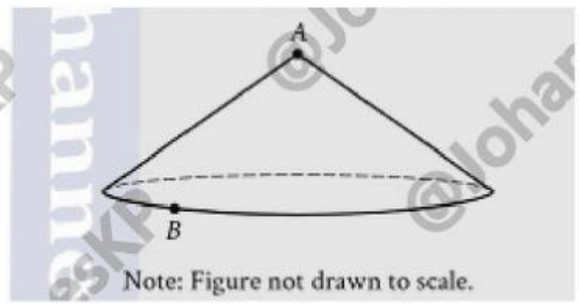
43.



A water pipe is in the shape of a circular tube. The figure above shows the pipe with a portion cut out. The dimensions of the pipe above are height 10 inches with thickness 4 inches. If the volume of the figure above is cubic inches, what is the radius r of the inner circle in inches?

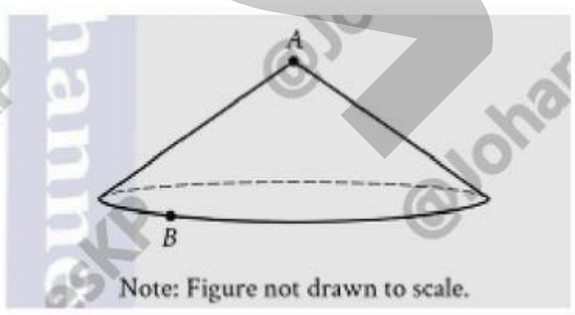
44. In triangle XYZ, angle Y is a right angle, the measure of angle Z is 56^0, and the length of YZ is 74 units. If the area, in square units, of triangle XYZ can be represented by the expression k tan 56^0 , where k is a constant, what is the value of k?

45.



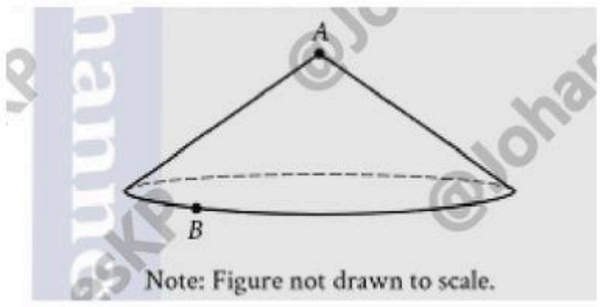
For the right circular cone shown,B is a point on the circumference of the base and the length of segment AB (not shown) is 32 centimeters. If the height of the cone is 16 centimeters and the volume of the cone is kπ cubic centimeters, what is the value of k?

46.



For the right circular cone shown,B is a point on the circumference of the base and the length of segment AB(not shown) is 62 centimeters.If the height of the cone is 31 centimeters and the volume of the cone is $k\pi$ cubic centimeters,what is the value of k?

47.



For the right circular cone shown,B is a point on the circumference of the base and the length of segment AB(not shown) is 78 centimeters.If the height of the cone is 39 centimeters and the volume of the cone is $k\pi$ cubic centimeters,what is the value of k?

48. A right square pyramid has a total surface area of 36, 864 square inches, and the combined surface area of the four lateral faces of this pyramid is 20, 480 square inches. What is the height, in inches, of this pyramid?

A) 48 B) 64 C) 80 D) 128

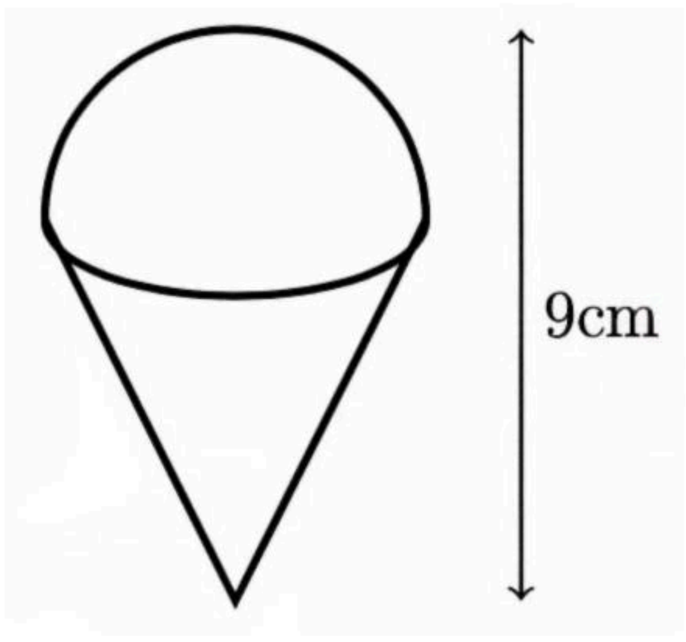
49. A right square pyramid has a total surface area of 36, 864 square inches, and the combined surface area of the four lateral faces of this pyramid is 20, 480 square inches. What is the slant height, in inches, of this pyramid?

50. A rectangular banner has an area of 2,600 square inches. A copy of the banner is made in which the length and width of the original are increased by 40%. What is the area of the copy, in square inches?

51. A rectangular banner has an area of 3,800 square inches. A copy of the banner is made in which the length and width of the original banner are each increased by 30%. What is the area of the copy, in square inches?

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52.



A hemisphere and a cone have circular bases of equal circumference and have been connected at their bases, as shown in the figure. The diameter of the base of the hemisphere is 6 cm and the total height of the figure is 9 cm. What is the total volume, in cm^3, of the cone and hemisphere

A) 18π B) 45π

C) 36π D) 162π

53. The table gives the areas and perimeters of two similar rectangles, where n is a constant. What is the value of n?

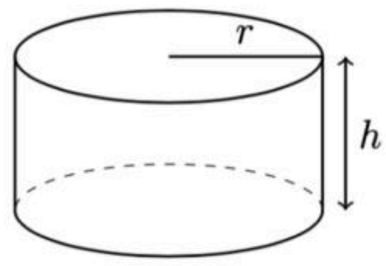
	Area (square inches)	Perimeter (inches)
Rectangle A	2,450	490
Rectangle B	9,800	n

54.

	Volume (cubic units)
Right circular cylinder A	112π
Right circular cylinder B	$3,024\pi$

The table shows the volume of two similar solids, right circular cylinder A and right circular cylinder B. The radius of right circular cylinder A is 4 units. The surface area of right circular cylinder A is $k\pi$ square units, where k and n are constants. What is the value of n - k? (The surface area of a right circular cylinder with radius r and height h is $2\pi r^2 + 2\pi rh$.)

55.



The figure shown is a right circular cylinder with a radius r and a height of h. A second right circular cylinder (not shown) has a volume that is 576 times as large as the volume of the cylinder shown. Which of the following could represent the radius R, in termsof r, and the height H, in terms of h, of the second cylinder?

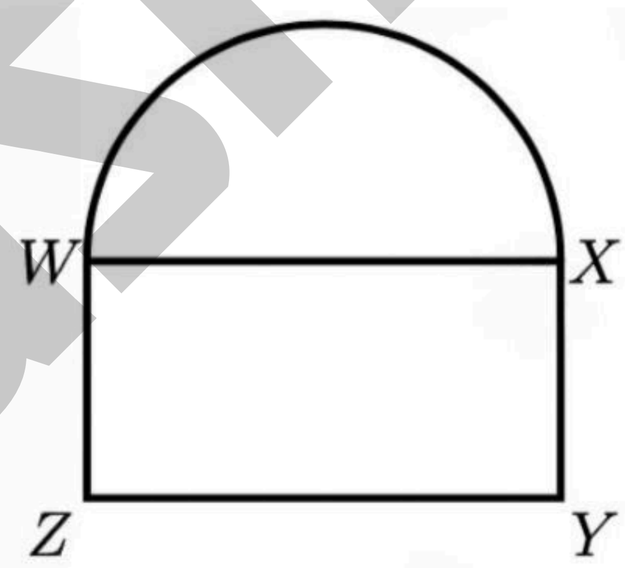
A) R= 9r and H = 8h

B) R= 9r and H = 64h

C) R= 8r and H = 9h

D) R= 64r and H = 9h

56.



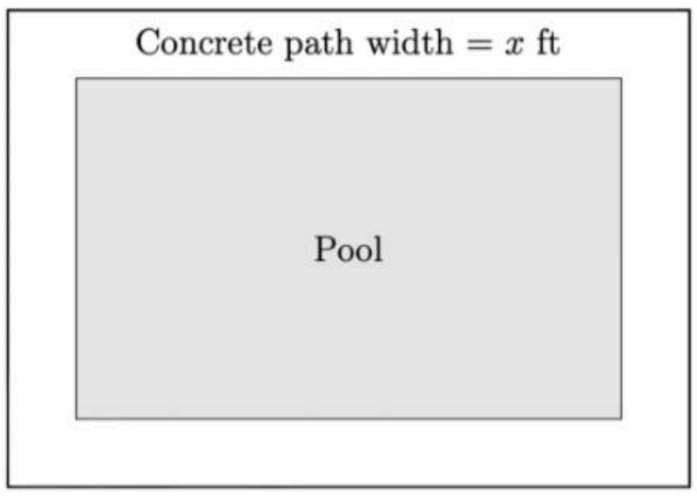
The figure shown consists of a rectangle and a semicircle, where the length of WX is 20 units and the length of WZ is 5 units. The diameter of the semicircle is WX. Which of the following expressions represents the area, in square units, of the figure?

A) 20 + 5 + 10π C) 20 ×5 + 50π

B) 20×5+10πr D) 20×5+100π

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57.

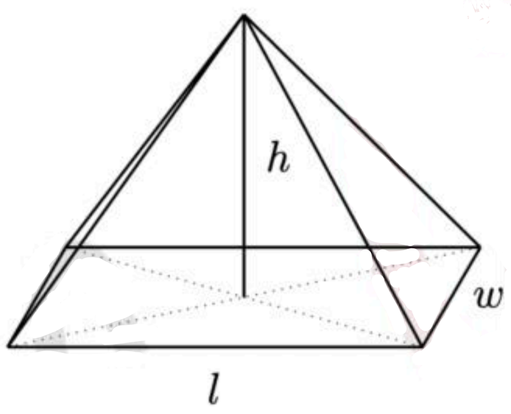


Note: Figure not drawn to scale.

The figure shows a rectangular pool surrounded by a concrete path that is x feet (ft) wide on all sides. The pool is 21 ft long and 13 ft wide. The area of the concrete path is 240 ft. What is the value of x?

A) 3 B) 6 C) 20 D) 40

58.



The figure shown is a right rectangular pyramid, where l = 18 units, w = 9 units, and h = 12 units. What is the surface area, in square units, of the pyramid?

59. A rectangular area consists of 3,179 equal squares where each square has an area of k. If the length of the rectangular area is 2.75 times the width and the width is equal to x $\sqrt{k}$, what is the value of x?

60. A right square pyramid has a height of 13 inches. A second right square pyramid has a height of 39 inches. The area of the bases of the two pyramids is 400 square inches. Find the closest to the difference in surface area of the second pyramid and the surface area of the first pyramid, in square inches, rounded to the nearest integer?

61.

	Volume (cubic inches)	Surface Area (square inches)
Rectangular Prism *A*	4,374	1,782
Rectangular Prism *B*	1,500,282	k

The table gives the volume and surface area of two similar rectangular prisms, where k is a constant. What is the value of k?

A)5,346 B)12,474

C)87,318 D)611,226

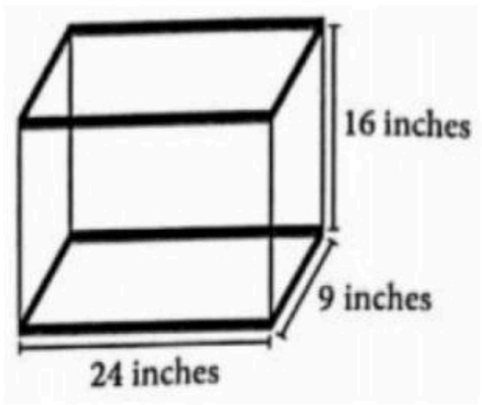
62. The edge length of the square base and the height of a right square pyramid are integers, and the pyramid has a volume of 16,464 cubic inches. If the slant height is 35 inches, what is the height, in inches, of this pyramid

63. The surface area of rectangular prism A is 312 m ^{2}. The surface area of area of rectangular prism B is 11,323 m ^{2}. Rectangular prism A has a volume of 224m^3. If both rectangular prisms are similar, what is the volume of rectangular prism B?

64. A rectangular gameboard is divided into 480 square regions of equal area k, in square units. The length of the gameboard is 7.5 times the width of the gameboard. If the width of the gameboard is x $\sqrt{k}$ units, what is the value of x?

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65.



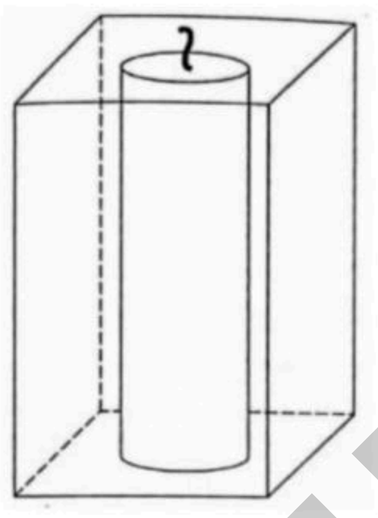
Staff at a pet store want to fill the bottom of 50 fish tanks (one shown) with two inches of sand. Sand comes in full-size 40-pound bags. If 1 cubic inch of sand weighs 0.125 pounds, how many bags of sand does the pet store needs to buy?

66. Alma completely fills a small cylindrical glass with a height of 6 inches and a diameter of 3 inches with water. She then pours the water from the small glass into a larger cylindrical glass that is 8 inches tall and 4 inches in diameter. Assuming Alma doesn't spill any water, how many inches high will the water reach in the larger glass?

A)1.5 B)2.25

C)3.375 D)6.0

67.



In the figure, a cylindrical candle with a diameter of 2 inches and height of 8 inches sits within a rectangular glass box. The box is 15 square inches. If Felipe wants to fill the space between the candle and the box with wax, how many cubic inches of wax does she need?

A) $120 - 8\pi$ B)$120 - 32\pi$

C)$225 - 8\pi$ D)$225 - 32\pi$

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