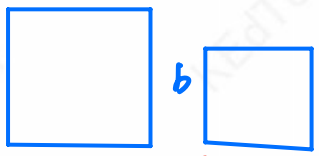
8

The perimeter of square A is 144 inches greater than the perimeter of square B. The side length of square A is how many inches greater than the side length of square B?

A) 12
B) 36
C) 72
D) 144



A: 4a
B: 4b
$4a - 4b = 144 \Rightarrow a - b = \frac{144}{4} = 36$

9

A rectangle has a width of $(x - 8)$ units and a length of $(x + 5)$ units. If the rectangle has an area of 68 square units, what is the value of x ?

A) 9
B) 12
C) 15
D) 17

10

Parallelogram $ABCD$ is similar to parallelogram $PQRS$ such that A, B, C, and D correspond to P, Q, R, and S, respectively. The ratio of the length of side AB to the length of side PQ is 3 to 2. The area of $PQRS$ is 72 square units. What is the area, in square units, of $ABCD$?

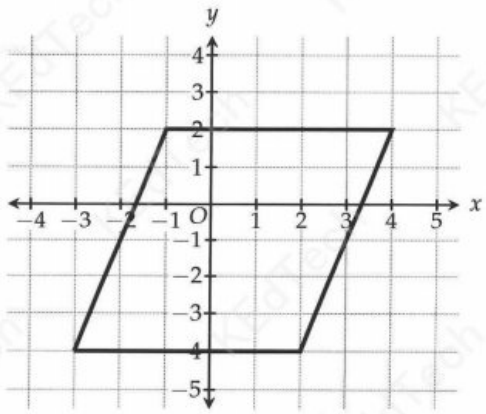
A) 32
B) 108
C) 162
D) 324

11

The length of rectangle A is 54 times the length of rectangle B and the width of rectangle A is 45 times the width of rectangle B. The area of rectangle A is n times the area of rectangle B. What is the value of n ?

$2 \times 2 = 3$

12



What is the area, in square units, of the parallelogram shown?

37

13

An object in the shape of a cube has a density of 390 grams per cubic centimeter. The object has a mass of 225 grams. To the nearest hundredth of a centimeter, what is the length of one edge of the object?

A) 0.58
B) 0.76
C) 0.83
D) 1.20

Density : 390
mass : 225
$\text{Density} = \frac{\text{mass}}{\text{Volume}}$
$x \rightarrow x^3$

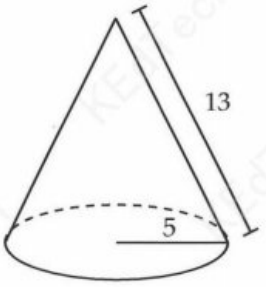
14

The volume of a sphere is equal to the volume of a cube with an edge length of 15 inches. To the nearest tenth of an inch, what is the length of the radius of the sphere?

A) 6.4
B) 9.3
C) 11.3
D) 13.6

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15



The right circular cone shown has a radius of 5 inches and a slant height of 13 inches. The volume of this cone is $k\pi$ cubic inches. What is the value of k ?

100

16

Cylinders A and B are right circular cylinders. The radius of cylinder A is 14 times the radius of cylinder B, and the height of cylinder A is half the height of cylinder B. The volume of cylinder A is how many times the volume of cylinder B?

98

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EXERCISE 2: Answers for this exercise start on page 399.

1

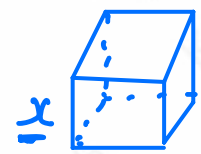
The area of square A is 576 times the area of square B. The perimeter of square A is how many times the perimeter of square B?

A) 6
B) 12
C) 24
D) 96

2

The surface area, in square inches, of a cube can be represented by the expression $24a^2$, where a is a positive constant. Which expression represents the volume, in cubic inches, of the cube?

A) $8a^3$
B) $16a^3$
C) $64a^6$
D) $216a^6$



$6x^2 = 24a^2$
$x^2 = 4a^2$
$x = 2a$
$(2a)^3 = 8a^3$

3

A right circular cylinder is carved from a stone slab that has a density of 2.4 grams per cubic centimeter. The height of the cylinder is 4 centimeters, and the base of the cylinder has an area of 28 square centimeters. To the nearest whole number, what is the mass, in grams, of this cylinder?

A) 3
B) 17
C) 47
D) 269

Density : 2.4 g/cm³
Height : 4 cm
Base : 28 cm²

Formula :
Density = Mass / Volume
Volume = $\pi r^2 h = 28 \times 4$

4

Rectangular prism X is similar to rectangular prism Y. Each edge length of rectangular prism Y is 3 times the corresponding edge length of rectangular prism X. The volume of rectangular prism Y is 525 cubic meters. What is the volume, in cubic meters, of rectangular prism X?

19. xy

5

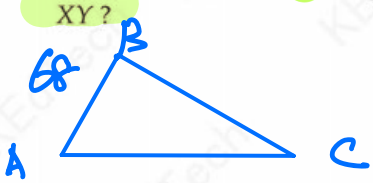
$$f(x) = \pi x^3 + \pi x^2$$

The given function f represents the volume, in cubic feet, of a right circular cylinder with a radius of x feet. Which expression represents the height, in feet, of the cylinder?

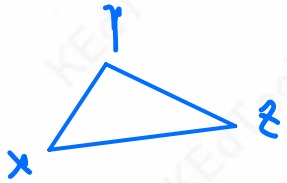
A) $x + 1$
B) πx^3
C) x
D) $x^3 + 1$

6

Triangle ABC is similar to triangle XYZ such that A, B, and C correspond to X, Y, and Z, respectively. The area of triangle ABC is 16 times the area of triangle XYZ. If the length of side AB is 68 inches, what is the length, in inches, of side XY?



$\frac{S_{ABC}}{S_{XYZ}} = \frac{16}{1}$



$\frac{S_{ABC}}{S_{XYZ}} = \left(\frac{AB}{XY}\right)^2$

$\frac{16}{1} = \left(\frac{AB}{XY}\right)^2$

$\frac{4}{1} = \frac{AB}{XY}$ $XY = 17$

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7

$$2xy + 100x + 100y$$

The given expression represents the surface area, in square centimeters, of a right rectangular prism with a length of x centimeters and a width of y centimeters. What is the height, in centimeters, of the rectangular prism?

A) 2
B) 25
C) 50
D) 100

8

$$A = x\left(\frac{75 - 2x}{2}\right)$$

The given equation represents the area A, in square inches, of a rectangle with a length of x inches. Which of the following is the best interpretation of 75 in this context?

A) The length of the rectangle is 75 inches greater than its width.
B) The sum of the length and the width of the rectangle is 75 inches.
C) The area of the rectangle cannot be greater than 75 square inches.
D) The perimeter of the rectangle is 75 inches.

9

A rectangular image on a screen has an area of 464 square centimeters. The image is edited so that its length is 25% greater than its original length and its width is 10% less than its original width. What is the area, in square centimeters, of the edited image?

$\S 22$

$lw = 464$

$1.25l \cdot 0.9w = 1.25 \times 0.9 \cdot lw$

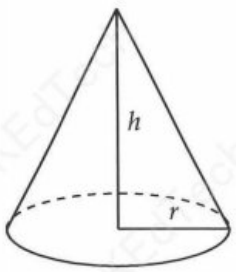
$\S 22$

10

A rectangle has a width that is 6 inches less than 5 times its length. The area of the rectangle is 287 square inches. What is the length of the rectangle, in inches?

p. 2

11



Cone M is a right circular cone with a radius of r and height of h, as shown. The volume of cone N (not shown) is 144 times the volume of cone M. Which of the following could represent the radius of cone N in terms of r and the height of cone N in terms of h ?

A) radius $= 4r$, height $= 6h$
B) radius $= 4r$, height $= 36h$
C) radius $= 6r$, height $= 4h$
D) radius $= 6r$, height $= 12h$

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12

A rectangular prism has a width that is 6 inches greater than its length and a height that is 12 inches less than its width. The equation $y = x(x-6)(x+6)$ represents this situation, where y is the volume, in cubic inches, of the rectangular prism and $y > 0$. Which of the following is the best interpretation of $x - 6$ in this context?

A) The length of the rectangular prism, in inches

B) The width of the rectangular prism, in inches

C) The height of the rectangular prism, in inches

D) The difference between the width and the length of the rectangular prism, in inches

13

An artifact in the shape of a right circular cylinder has a volume of 112 cubic inches. A replica of the artifact is made in which the radius and height of the original artifact are each increased by 50%. What is the volume, in cubic inches, of the replica?

14

A sphere has a diameter of 10 centimeters. A solid right circular cylinder is inside the sphere, such that the two bases of the cylinder are distinct parallel cross-sections of the sphere. Each base has a diameter of 6 centimeters. To the nearest cubic centimeter, what is the volume of the space in the sphere not taken up by the cylinder?

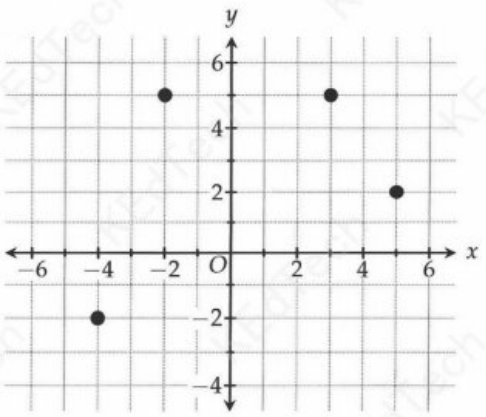
A) 226

B) 241

C) 297

D) 354

15



A quadrilateral is formed by connecting the four points shown. What is the area, in square units, of this quadrilateral?

16

Identical rectangles X and Y each have an area of $\frac{49}{5}$ square meters and a perimeter of P meters. If one of the shorter sides of rectangle X is glued to one of the shorter sides of rectangle Y, the resulting rectangle has a perimeter of $\frac{14}{9}P$ meters. What is the value of P ?

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