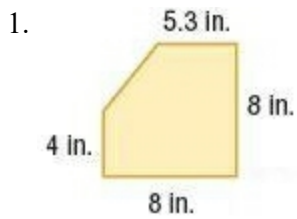


9-6 Area of Composite Figures

Find the area of the figure. Round to the nearest tenth if necessary.



SOLUTION:

The figure can be separated into a trapezoid and a rectangle. Find the area of each.

Area of Trapezoid

The height is $8 - 4$, or 4 inches.

$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(4)(8 + 5.3)$$

$$A = \frac{1}{2}(4)(13.3)$$

$$A = 26.6$$

Area of the Rectangle

$$A = lw$$

$$A = 8 \cdot 4$$

$$A = 32$$

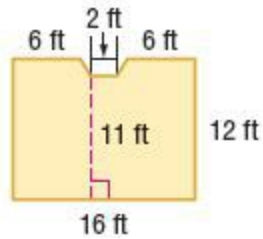
The area of the figure is $26.6 + 32$ or 58.6 square inches.

ANSWER:

$$58.6 \text{ in}^2$$

9-6 Area of Composite Figures

3. The floor plan of a kitchen is shown. If the entire kitchen floor is to be tiled, how many square feet of tile are needed?



SOLUTION:

The figure is a rectangle with a trapezoid section missing. Find the area of each. Subtract the area of the trapezoid from the area of the rectangle.

Area of Trapezoid

The unknown base is $16 - (6 + 6)$, or 4 feet. The height is $12 - 11$, or 1 foot.

$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(1)(4 + 2)$$

$$A = \frac{1}{2}(1)(6)$$

$$A = 3$$

Area of the Rectangle

$$A = lw$$

$$A = 12 \cdot 16$$

$$A = 192$$

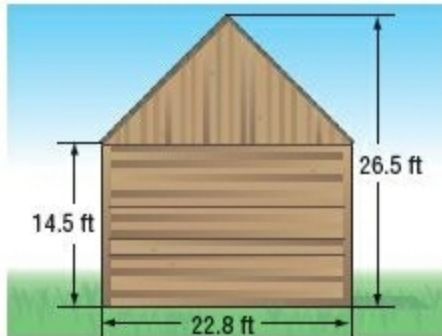
The square footage of tile needed is $192 - 3$ or 189 square feet.

ANSWER:

$$189 \text{ ft}^2$$

9-6 Area of Composite Figures

5. The diagram shows one side of a storage barn.
- This side needs to be painted. Find the total area to be painted.
 - Each gallon of paint costs \$20 and covers 350 square feet. Find the total cost to paint this side once. Justify your answer.



SOLUTION:

- The side of the barn can be separated into a triangle and a rectangle. Find the area of each.

Area of Rectangle

$$A = lw$$

$$A = 22.8 \cdot 14.5$$

$$A = 330.6$$

Area of Triangle

The height is $26.5 - 14.5$, or 12 feet.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(22.8)(12)$$

$$A = 136.8$$

The total area to be painted is $330.6 + 136.8$ or 467.4 square feet.

- You will need $467.4 \div 350 \approx 1.34$ gallons of paint. Since only whole gallons of paint can be purchased, you will need 2 gallons of paint. At \$20 each, the cost will be $2 \times \$20$ or \$40.

ANSWER:

a. 467.4 ft^2

- $467.4 \div 350 \approx 1.34$; Since only whole gallons of paint can be purchased, you will need 2 gallons of paint. At \$20 each, the cost will be $2 \times \$20$ or \$40.

9-6 Area of Composite Figures

7. **Persevere with Problems** Describe, how to separate the figure into simpler figures. Then estimate the area. One square unit equals 2,400 square miles. Justify your answer.



SOLUTION:

Sample answer: Add the areas of a rectangle and a triangle. Area of rectangle: $3 \times 4 = 12$; Area of triangle:

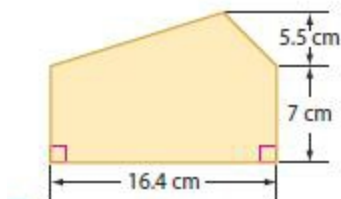
$\frac{1}{2} \times 3 \times 3 = 4.5$; $12 + 4.5 = 16.5$. So, an approximate area is $16.5 \times 2,400$ or 39,600 square miles.

ANSWER:

Sample answer: Add the areas of a rectangle and a triangle. Area of rectangle: $3 \times 4 = 12$; Area of triangle:

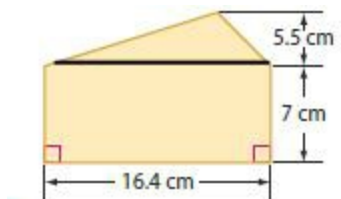
$\frac{1}{2} \times 3 \times 3 = 4.5$; $12 + 4.5 = 16.5$. So, an approximate area is $16.5 \times 2,400$ or 39,600 mi^2 .

9. **Make a Conjecture** Refer to the composite figure at the right. Make a conjecture about how the area of the composite figure changes if each dimension given is doubled. Then test your conjecture by doubling the dimensions and finding the area.



SOLUTION:

The area of the composite figure will be 4 times greater when the dimensions are doubled.



The find area of the original figure by creating a triangle and rectangle within the figure.

Area of triangle

9-6 Area of Composite Figures

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2} \times 16.4 \times 5.5$$

$$A = 45.1$$

Area of the rectangle

$$A = l \cdot w$$

$$A = 16.4 \cdot 7$$

$$A = 114.8$$

The total original area is $45.1 + 114.8 = 159.9$ square cm

Find the new area after doubling the dimensions.

Area of triangle

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2} \times 32.8 \times 11$$

$$A = 180.4$$

Area of the rectangle

$$A = l \cdot w$$

$$A = 32.8 \cdot 14$$

$$A = 459.2$$

The total area of the new figure is $180.4 + 459.2 = 639.2$ square cm

To find how many times larger the new area is divide the new area by the original area.

$$\frac{639.6}{159.9} = 4$$

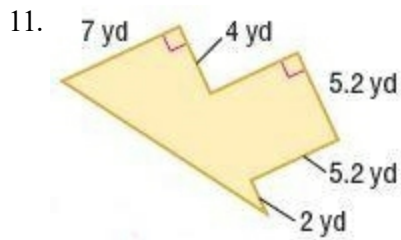
The new figure has an area that is 4 times greater than the original.

ANSWER:

The area is multiplied by 4. Original area: 159.9 square cm; new area: 639.6 square cm

9-6 Area of Composite Figures

Find the area of the figure. Round to the nearest tenth if necessary.



SOLUTION:

The figure can be separated into a square and a triangle. Find the area of each.

Area of Square

$$A = lw$$

$$A = 5.2 \cdot 5.2$$

$$A = 27.04$$

Area of Triangle

The base is $4 + 5.2 + 2$, or 11.2 yards.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(7)(11.2)$$

$$A = 39.2$$

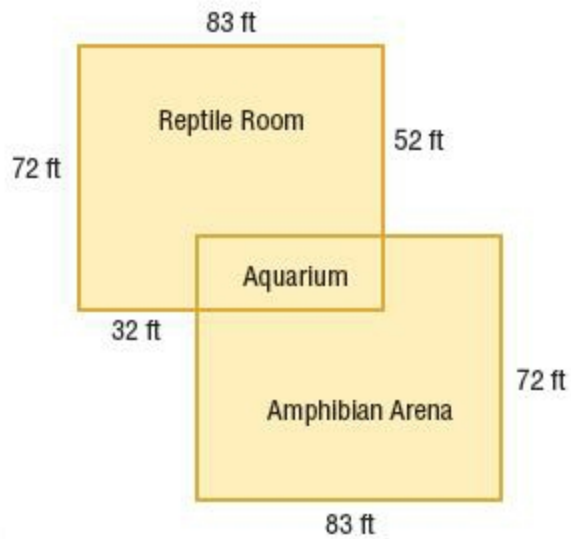
The area of the figure is $27.0 + 39.2$ or 66.2 square yards.

ANSWER:

$$66.2 \text{ yd}^2$$

9-6 Area of Composite Figures

13. At the local zoo, the aquarium can be seen from the Reptile Room and the Amphibian Arena. What is the total area of both rooms and the aquarium?



SOLUTION:

Area of Reptile Room: 72×83 or 5976

Area of Amphibian Arena: 72×83 or 5976

The sum of the areas: $5976 + 5976$ or 11,952

Overlapping area: 20×51 or 1,020

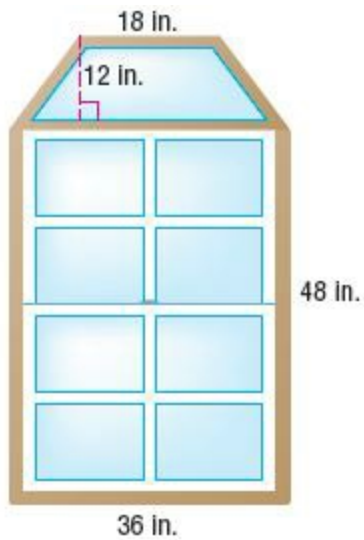
Subtract the overlapping area: $11,952 - 1,020 = 10,932$ square feet

ANSWER:

10,932 ft²

9-6 Area of Composite Figures

15. A window has the dimensions shown.



Determine if each statement is true or false.

- a. The area of the trapezoid section of the window is 648 square inches. True False
b. The area of the rectangular section of the window is 1,728 square inches. True False
c. The area of the entire window is 2,376 square inches. True False

SOLUTION:

a. area of the trapezoid

$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(12)(18 + 36)$$

$$A = \frac{1}{2}(12)(54)$$

$$A = \frac{1}{2}(648)$$

$$A = 324$$

The area of the trapezoid is 324 square inches, so letter a is false.

b. area of rectangle

$$A = lw$$

$$A = 36 \bullet 48$$

$$A = 1,728$$

The area of the rectangle is 1,728 square inches. So letter b is true.

c. The area of the window is $1,728 + 324$ or 2,052 square inches. So letter c is false.

ANSWER:

- a. false
b. true
c. false

9-6 Area of Composite Figures

Multiply.

17. $36 \times 12 =$

SOLUTION:

$$\begin{array}{r} 1 \\ 36 \\ \times 12 \\ \hline 72 \\ +360 \\ \hline 432 \end{array}$$

ANSWER:

432

19. $72 \times 200 =$

SOLUTION:

$$\begin{array}{r} 72 \\ \times 200 \\ \hline 14400 \end{array}$$

ANSWER:

14,400

21. Hiking burns about 144 Calories each half hour. About how many Calories can be burned if someone hikes 3 days a week for an hour?

SOLUTION:

Since 144 Calories are burned each half hour, $144 + 144$ or 288 Calories are burned in an hour. So, for 3 days a person can burn 288×3 or 864 Calories.

ANSWER:

864 Calories