

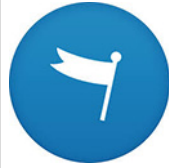
شكراً لتحميلك هذا الملف من موقع المناهج الإماراتية



حل أوراق عمل الدرس السادس سطح وحجم الأشكال المركبة من
الوحدة التاسعة - منهج ريفيل

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التواصل الاجتماعي بحسب الصف السابع



روابط مواد الصف السابع على تلغرام

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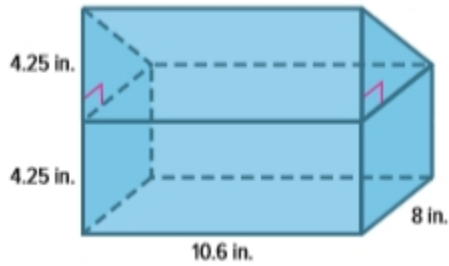
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9-6 Volume and Surface of Composite Figures

1. Mya's lunchbox is shown. What is the volume of the lunchbox? Round to the nearest tenth if necessary.



SOLUTION:

The lunchbox is composed of a rectangular prism and triangular prism. Find the volume of each figure.

Rectangular Prism

$$\begin{aligned} V &= Bh \\ &= (10.6 \cdot 8)4.25 \\ &= 360.4 \end{aligned}$$

Triangular Prism

$$\begin{aligned} V &= Bh \\ &= \left(\frac{1}{2} \cdot 8 \cdot 4.25\right)10.6 \\ &= 180.2 \end{aligned}$$

So, the total volume of the lunchbox is about 360.4 cubic inches + 180.2 cubic inches or 540.6 cubic inches.

9-6 Volume and Surface of Composite Figures

2. Anson's toy rocket is shown. What is the volume of the rocket? Round to the nearest tenth if necessary.



SOLUTION:

The rocket is composed of a rectangular prism and triangular pyramid. Find the volume of each figure.

Rectangular Prism

$$\begin{aligned}V &= Bh \\ &= (8.2 \cdot 1.1)1.1 \\ &= 9.922\end{aligned}$$

Triangular Pyramid

$$\begin{aligned}V &= \frac{1}{3}Bh \\ &= \frac{1}{3}(1.1 \cdot 1.1)2.1 \\ &= 0.847\end{aligned}$$

Find the total volume of the rocket.

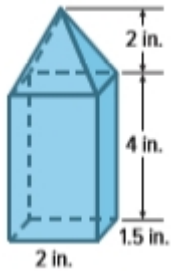
$$\begin{aligned}9.922 + 0.847 &= 10.769 \\ &= 10.8\end{aligned}$$

Round to the nearest tenth.

So, the total volume of the rocket is about 10.8 cubic inches.

9-6 Volume and Surface of Composite Figures

3. What is the volume of the birdfeeder? Round to the nearest tenth if necessary.



SOLUTION:

The birdfeeder is composed of a rectangular prism and triangular pyramid. Find the volume of each figure.

Rectangular Prism

$$\begin{aligned} V &= Bh \\ &= (2 \cdot 1.5)4 \\ &= 12 \end{aligned}$$

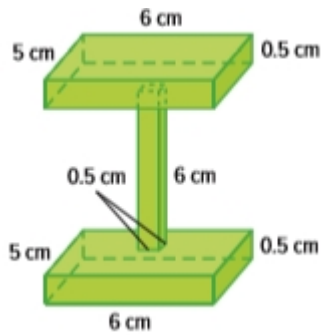
Triangular Pyramid

$$\begin{aligned} V &= \frac{1}{3}Bh \\ &= \frac{1}{3}(2 \cdot 1.5)2 \\ &= 2 \end{aligned}$$

So, the total volume of the birdfeeder is 12 cubic inches + 2 cubic inches or 14 cubic inches.

9-6 Volume and Surface of Composite Figures

4. Zahir made this wooden perch for his pet bird. What is the volume of the bird perch? Round to the nearest tenth if necessary.



SOLUTION:

The perch is composed of a rectangular prism and 2 congruent rectangular prisms. Find the volume of each figure.

Rectangular Prism

$$\begin{aligned} V &= Bh \\ &= (0.5 \cdot 0.5)6 \\ &= 1.5 \end{aligned}$$

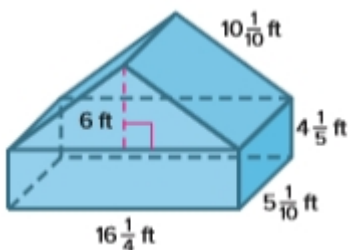
Rectangular Prisms

$$\begin{aligned} V &= 2Bh \\ &= 2(6 \cdot 5)0.5 \\ &= 30 \end{aligned}$$

So, the total volume of the perch is 1.5 cubic centimeters + 30 cubic centimeters or 31.5 cubic centimeters.

9-6 Volume and Surface of Composite Figures

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



SOLUTION:

The figure is composed of a rectangular prism and a triangular prism.

Find the areas of the 5 faces of rectangular prism.

$$\text{Area of sides: } 2\left(5\frac{1}{10} \cdot 4\frac{1}{5}\right) = 42.84 \text{ ft}^2$$

$$\text{Area of bottom: } \left(16\frac{1}{4} \cdot 5\frac{1}{10}\right) = 82.875 \text{ ft}^2$$

$$\text{Area of front and back: } 2\left(16\frac{1}{4} \cdot 4\frac{1}{5}\right) = 136.5 \text{ ft}^2$$

The surface area the faces of rectangular prism is 262.215 square feet.

Find the areas of the 4 faces of the triangular prism.

In this triangular prism, there are two congruent triangular bases.

Area Bases:

$$\begin{aligned} A &= 2\left(\frac{1}{2} \cdot 16\frac{1}{4} \cdot 6\right) \\ &= 97.5 \text{ ft}^2 \end{aligned}$$

Area of the two congruent rectangular faces.

$$\begin{aligned} A &= 2\left(10\frac{1}{10} \cdot 5\frac{1}{10}\right) \\ &= 103.2 \text{ ft}^2 \end{aligned}$$

Find the sum of the areas of the faces.

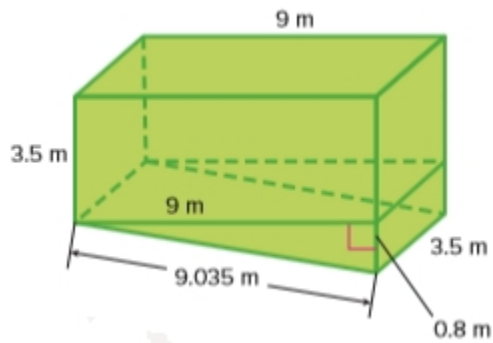
$$262.215 + 97.5 + 103.2 = 462.735$$

$$= 462.7 \quad \text{Round to the nearest tenth.}$$

The surface area the composite figure is 462.7 square feet.

9-6 Volume and Surface of Composite Figures

6. **Open Response** Find the surface area of the composite figure. Round to the nearest tenth if necessary.



SOLUTION:

The figure is composed of a rectangular prism and a triangular prism.

Find the areas of the 5 faces of rectangular prism.

$$\text{Area of sides: } 2(3.5 \cdot 3.5) = 24.5 \text{ m}^2$$

$$\text{Area of top: } (9 \cdot 3.5) = 31.5 \text{ m}^2$$

$$\text{Area of front and back: } 2(9 \cdot 3.5) = 63 \text{ m}^2$$

The surface area the faces of rectangular prism is 119 square meters.

Find the areas of the 4 faces of the triangular prism. In this triangular prism, there are two congruent triangular bases.

Area Bases:

$$\begin{aligned} A &= 2\left(\frac{1}{2} \cdot 9.035 \cdot 0.8\right) \\ &= 7.2 \text{ m}^2 \end{aligned}$$

Area of the side rectangular face

$$\begin{aligned} A &= (3.5 \cdot 0.8) \\ &= 2.8 \text{ m}^2 \end{aligned}$$

Area of the side bottom face

$$\begin{aligned} A &= (9.035 \cdot 3.5) \\ &= 31.6 \text{ m}^2 \end{aligned}$$

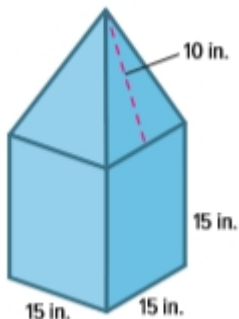
Find the sum of the areas of the faces.

$$119 + 7.2 + 2.8 + 31.6 = 160.6$$

The surface area the composite figure is 160.6 square meters.

9-6 Volume and Surface of Composite Figures

7. For a charity drive, each classroom is given a coin box made of cardboard like the one shown. The student council wants to construct a version of the coin box that has a scale factor of 3 times the classroom coin box. Is 100 square feet of cardboard enough to build the new coin box? Write an argument that can be used to defend your solution.



SOLUTION:

In the coinbox, there are five square faces and four triangular faces.

Find the areas of the 5 squares.

$$\begin{aligned} A &= 5s^2 \\ &= 5(15)^2 \\ &= 1,125 \text{ in}^2 \end{aligned}$$

Find the areas of the 4 triangular faces.

$$\begin{aligned} A &= 4\left(\frac{1}{2}bh\right) \\ &= 4\left(\frac{1}{2} \cdot 15 \cdot 10\right) \\ &= 330 \text{ in}^2 \end{aligned}$$

The total surface area the coinbox is 1,125 square inches + 330 square inches or 1,425 square inches.

Convert 1,425 square inches to square feet. There are 144 square inches in 1 square foot.

$$1,425 \div 144 \approx 9.89$$

The total surface area the coinbox is about 9.89 square feet.

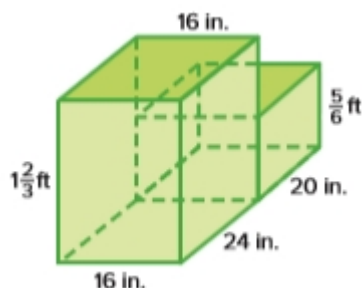
Find the surface area of the new version.

$$\begin{aligned} S.A. &= 9.89 \times 32 && \text{Multiply the area by the square of the scale factor.} \\ &= 89.01 && \text{Simplify.} \end{aligned}$$

The new version of the coin box has a surface area of 89.01 square feet. Because $89.01 < 100$ there is enough cardboard available.

9-6 Volume and Surface of Composite Figures

8. Jake wants to buy the foam gymnastic block shown. If the foam used to make the gymnastic block costs \$24.99 per cubic foot, what is the cost of this block, to the nearest dollar?



SOLUTION:

Convert $1\frac{2}{3}$ feet and $\frac{5}{6}$ feet to inches. There are 12 inches 1 foot.

$$1\frac{2}{3} \times 12 = 20 \text{ inches}$$

$$\frac{5}{6} \times 12 = 10 \text{ inches}$$

The figure is composed of two rectangular prisms. Find the volume each prism.

Rectangular Prism 1

$$\begin{aligned} V &= Bh \\ &= (16 \cdot 24)20 \\ &= 7,680 \text{ in}^3 \end{aligned}$$

Rectangular Prism 2

$$\begin{aligned} V &= Bh \\ &= (16 \cdot 20)10 \\ &= 3,200 \text{ in}^3 \end{aligned}$$

The total volume is 7,680 cubic inches + 3,200 cubic inches or 10,880 cubic inches.

Convert 10,880 cubic inches to cubic feet. There are 1,728 cubic inches in 1 cubic foot.

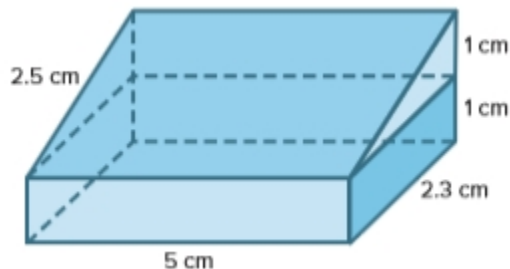
$$10,880 \div 1,728 = 6.3$$

The total volume is about 6.3 cubic feet.

So, the total cost is $\$24.99 \times 6.3$ or \$157.

9-6 Volume and Surface of Composite Figures

9. **Reason Inductively** A student said that the surface area of the figure below was 57.4 square centimeters. Is the student correct? Explain.



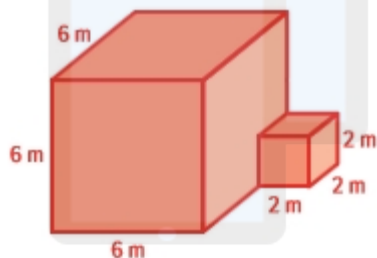
SOLUTION:

no; Sample answer: The student included the shared portion of the figure. The correct surface area is $57.4 - 11.5$ or 45.9 cm^2 .

10. Draw and label a composite figure made up of two prisms. Then find the volume of the figure.

SOLUTION:

Sample answer:



Volume of the larger prism:

$$\begin{aligned} V &= 6 \times 6 \times 6 \\ &= 216 \text{ m}^3 \end{aligned}$$

Volume of the smaller prism:

$$\begin{aligned} V &= 2 \times 2 \times 2 \\ &= 8 \text{ m}^3 \end{aligned}$$

The total volume is $216 \text{ m}^3 + 8 \text{ m}^3$ or 224 m^3 .

11. **Be Precise** Explain how finding the volume and surface area of composite figures is similar.

SOLUTION:

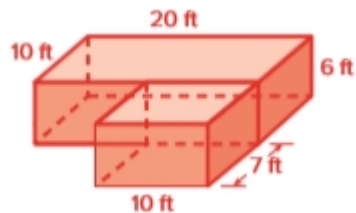
Sample answer: When finding the volume and surface area, you decompose the composite figure into solids/figures whose volumes/areas you know how to find.

9-6 Volume and Surface of Composite Figures

12. **Create** Write and solve a real-world problem where you find the volume of a composite figure.

SOLUTION:

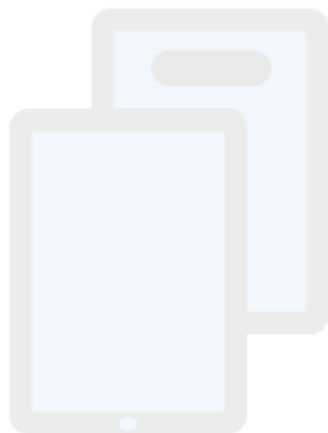
Sample answer: Find the volume of TJ's pool shown. It consists of two prisms.



Volume of the larger prism: $20 \times 10 \times 6$ or $1,200 \text{ ft}^3$

Volume of the smaller prism: $10 \times 7 \times 6$ or 420 ft^3

The total volume is $1,200 \text{ ft}^3 + 420 \text{ ft}^3$ or $1,620 \text{ ft}^3$.



تم تحميل هذا الملف من
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