Name _____

Lesson 82

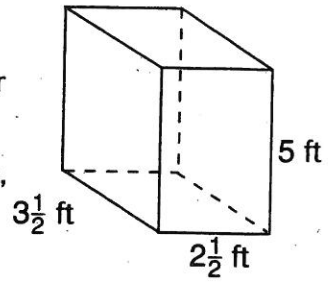
COMMON CORE STANDARD CC.6.G.2

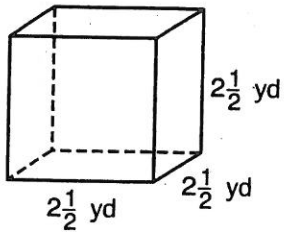
Lesson Objective: Use formulas to find the volume of rectangular prisms with fractional edge lengths.

Algebra • Volume of Rectangular Prisms

You can find the volume of a prism by using the formula $V = Bh$. V stands for volume, B stands for the area of the base, and h stands for the height.

For a rectangular prism, any face can be the base, since all faces are rectangles.





Find the volume of the rectangular prism.

Step 1 Find the area of the base. The base is $2\frac{1}{2}$ ft by $3\frac{1}{2}$ ft.

$A = l \times w$

$A = 2\frac{1}{2}\text{ ft} \times 3\frac{1}{2}\text{ ft} = 8\frac{3}{4}\text{ ft}^2$

Step 2 Multiply the area of the base by the height.

$V = Bh$

$V = 8\frac{3}{4}\text{ ft}^2 \times 5\text{ ft} = 43\frac{3}{4}\text{ ft}^3$

So, the volume of the rectangular prism is $43\frac{3}{4}$ ft^3.

Find the volume of the cube.

Step 1 Because the length, width, and height are all equal, you can use a special formula.

$V = Bh = l \times w \times h$

$V = s^3$

Step 2 Substitute $2\frac{1}{2}$ for s.

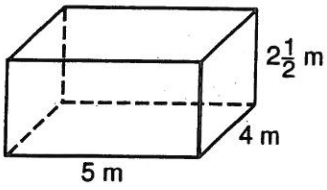
$V = s^3 = \left(2\frac{1}{2}\right)^3 = \left(\frac{5}{2}\right)^3$

$V = \frac{5}{2}\text{ yd} \times \frac{5}{2}\text{ yd} \times \frac{5}{2}\text{ yd} = \frac{125}{8}\text{ yd}^3$

$= 15\frac{5}{8}\text{ yd}^3$

So, the volume of the cube is $15\frac{5}{8}$ yd^3.

Find the volume.

1. 

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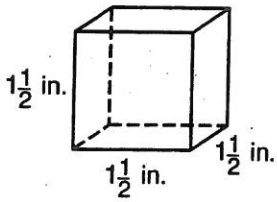
2. 

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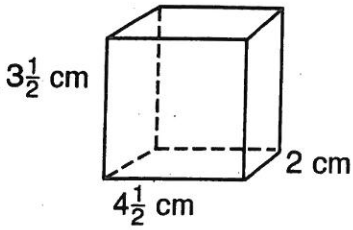
3. 

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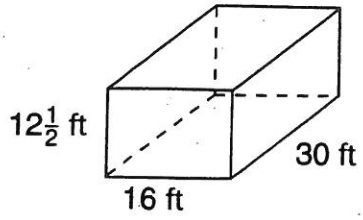
4. 

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1. A moving box is a rectangular prism with a width of 24 inches and a height of $18\frac{1}{2}$ inches. The volume of the box is 10,656 cubic inches. What is the length of the box?

   (A) 12 inches
   (B) 24 inches
   (C) 42 inches
   (D) 432 inches

2. Marci bought a box of energy-efficient light bulbs. The box had dimensions of 10 inches by $5\frac{1}{2}$ inches by 6 inches. What is the volume of this box?

   (A) 330 cubic inches
   (B) $300\frac{1}{2}$ cubic inches
   (C) 296 cubic inches
   (D) $21\frac{1}{2}$ cubic inches

3. Mr. Jackson rented a storage unit in the shape of a rectangular prism. The volume of the unit is 230 cubic yards. The storage unit is $5\frac{3}{4}$ yards wide and 10 yards long. What is the height of the storage unit?

   (A) 2 yards
   (B) 4 yards
   (C) 14 yards
   (D) 50 yards

4. A rectangular box is 20 inches long, $18\frac{1}{2}$ inches wide, and $24\frac{1}{2}$ inches high. What is the volume of the box?

   (A) $1{,}086\frac{1}{8}$ cubic inches
   (B) $2{,}173\frac{1}{4}$ cubic inches
   (C) $4{,}532\frac{1}{2}$ cubic inches
   (D) 9,065 cubic inches

Problem Solving REAL WORLD

5. A cereal box is a rectangular prism that is 8 inches long and $2\frac{1}{2}$ inches wide. The volume of the box is 200 $in.^3$. What is the height of the box?

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6. A stack of paper is $8\frac{1}{2}$ in. long by 11 in. wide by 4 in. high. What is the volume of the stack of paper?

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