Objective   Dividing with Surface Area and Volume

Warm-Up

Estimate each quotient.

1. 268 ÷ 5

2. 904 ÷ 8

3. 447 ÷ 9

4. 2883 ÷ 3

Dimensions of a Tank

The Think Tank designs and creates customized tanks and aquariums for oceanographers. A team of oceanographers who study the characteristics of plankton requested several tanks that have a volume of 240 cubic feet and bases with various areas, but they didn't give any heights. Provide The Think Tank with tank heights using the information given.

1. B = 10 square feet

2. B = 15 square feet

3. B = $46\frac{2}{3}$ square feet

# Division of Decimals and Whole Numbers

As you demonstrated, if you know the volume of a right rectangular prism and the area of the base you can divide to determine the height. Likewise, if you know the volume and the height of a rectangular prism, you can calculate the area of the base. If the volume of a right rectangular prism is 3.57 cubic feet and the height is 3 feet, what strategy can you use to determine the area of the base?

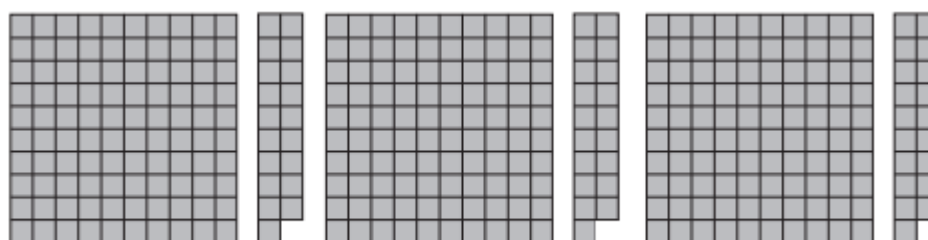You can use hundredths grids to model dividing decimals.

WORKED EXAMPLE

Let's consider 3.57 ÷ 3.

First, represent 3.57. Shade 3 hundredths grids to represent 3. Shade 5 columns in a fourth grid to represent 5 tenths. Then shade 7 more squares to represent 7 hundredths.
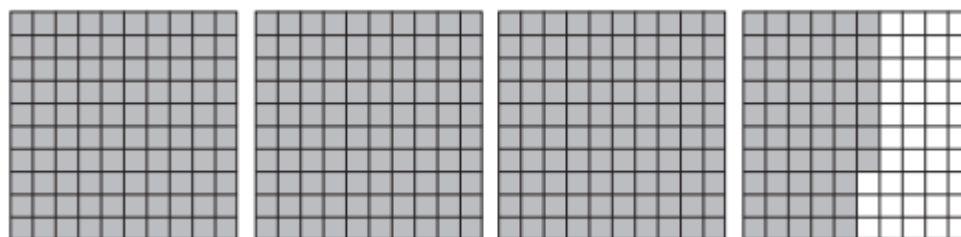
Let's consider 3.57 ÷ 3.

First, represent 3.57. Shade 3 hundredths grids to represent 3. Shade 5 columns in a fourth grid to represent 5 tenths. Then shade 7 more squares to represent 7 hundredths.

Group 1   Group 2   Group 3

Let's consider 3.57 ÷ 3.

First, represent 3.57. Shade 3 hundredths grids to represent 3. Shade 5 columns in a fourth grid to represent 5 tenths. Then shade 7 more squares to represent 7 hundredths.

You can also use a standard algorithm to divide 3.57 ÷ 3.

5 tenths divided into 3 equal groups is 1 tenth in each group with 2 tenths left over.

2 tenths and 7 hundredths is 27 hundredths. 27 hundredths divided into 3 equal groups is 9 hundredths in each group with 0 hundredths left over.

3 ones divided into 3 equal groups is 1 one in each group with 0 ones left over.

$$
\begin{array}{r}
1\ .\ 1\ 9 \\
3\overline{)3\ .\ 5\ 7} \\
-3 \\
\hline
0\ \ \ \ 5 \\
-\ 3 \\
\hline
2\ \ 7 \\
-\ 2\ \ 7 \\
\hline
0
\end{array}
$$

quotient

divisor

dividend

1. Compare the two worked examples.

a. What is the area of the base of the right rectangular prism?

b. Describe how the hundredths grid model represents different parts of the standard algorithm.

c. Why does the standard algorithm show subtracting 3 from the 3 ones in the dividend?

d. What does the 05 represent in the standard algorithm?

e. What does 27 – 27 represent in the standard algorithm?
Use the hundredths grid model to help you explain.

2. The volume of a right rectangular prism is 26,112 cubic feet and its base has an area of 256 square feet. What is the height? Examine each solution. What did Dustin do incorrectly?

Morgan 👍
I used my strategy from earlier.

```
      102
256)26,112
   -256
    512
   -512
```

The height of the right rectangular prism is 102 feet.

Dustin 👎
The height of the prism should be 12 feet.

```
       1 2
256)26,112
   -256
    512
   -512
```

3. The area of the base of the rectangular prism is 1.19 square feet. Calculate the width of each rectangular prism with the given length.
a. Length = 2 feet   b. Length = 3 feet   ac. Length = 4 feet

Objective   Dividing with Surface Area and Volume

Review

1. Mary Alice has decided to give her best friend a candle for her birthday. To wrap the candle, she spends $2.50 on a rectangular sheet of wrapping paper that is 24 inches by 19.5 inches. How many square inches are in one rectangular sheet of wrapping paper?

2. Calculate the surface area of a Rubik's Cube that has a width of 57 millimeters.

3. Determine the area of a triangle that has a height of 4 feet and a base of $6\frac{1}{2}$ feet.

4. Determine the quotient.

   $12\frac{3}{4} \div 1\frac{1}{5}$

5. Determine the product of each.

   a. 3.01×5.8 b. 1.2×1.2