Lesson 14: The Division Algorithm—Converting Decimal Division into Whole Number Division Using Fractions

Classwork

Opening Exercise

Divide $\frac{1}{2} \div \frac{1}{10}$. Use a tape diagram to support your reasoning.

Relate the model to the invert and multiply rule.

Example 1

Evaluate the expression. Use a tape diagram to support your answer.

$0.5 \div 0.1$

Rewrite $0.5 \div 0.1$ as a fraction.

Express the divisor as a whole number.

Exercises 1–3

Convert the decimal division expressions to fractional division expressions in order to create whole number divisors. You do not need to find the quotients. Explain the movement of the decimal point. The first exercise has been completed for you.

1. $18.6 \div 2.3$

    $$\frac{18.6}{2.3} \times \frac{10}{10} = \frac{186}{23}$$

    $186 \div 23$

    I multiplied both the dividend and the divisor by ten, or by one power of ten, so each decimal point moved one place to the right because they grew larger by ten.

2. $14.04 \div 4.68$

3. $0.162 \div 0.036$

Example 2

Evaluate the expression. First, convert the decimal division expression to a fractional division expression in order to create a whole number divisor.

$25.2 \div 0.72$

Use the division algorithm to find the quotient.

Exercises 4–7

Convert the decimal division expressions to fractional division expressions in order to create whole number divisors. Compute the quotients using the division algorithm. Check your work with a calculator.

4. $2,000 \div 3.2$

5. $3,581.9 \div 4.9$

6. $893.76 \div 0.21$

7. $6.194 \div 0.326$

Example 3

A plane travels 3,625.26 miles in 6.9 hours. What is the plane's unit rate?

Represent this situation with a fraction.

Represent this situation using the same units.

Estimate the quotient.

Express the divisor as a whole number.

Use the division algorithm to find the quotient.

Use multiplication to check your work.

Problem Set

Convert decimal division expressions to fractional division expressions to create whole number divisors.

1. $35.7 \div 0.07$

2. $486.12 \div 0.6$

3. $3.43 \div 0.035$

4. $5{,}418.54 \div 0.009$

5. $812.5 \div 1.25$

6. $17.343 \div 36.9$

Estimate quotients. Convert decimal division expressions to fractional division expressions to create whole number divisors. Compute the quotients using the division algorithm. Check your work with a calculator and your estimates.

7. Norman purchased 3.5 lb. of his favorite mixture of dried fruits to use in a trail mix. The total cost was $16.87. How much does the fruit cost per pound?

8. Divide: $994.14 \div 18.9$

9. Daryl spent $4.68 on each pound of trail mix. He spent a total of $14.04. How many pounds of trail mix did he purchase?

10. Mamie saved $161.25. This is 25% of the amount she needs to save. How much money does Mamie need to save?

11. Kareem purchased several packs of gum to place in gift baskets for $1.26 each. He spent a total of $8.82. How many packs of gum did he buy?

12. Jerod is making candles from beeswax. He has 132.72 ounces of beeswax. If each candle uses 8.4 ounces of beeswax, how many candles can he make? Will there be any wax left over?

13. There are 20.5 cups of batter in the bowl. This represents 0.4 of the entire amount of batter needed for a recipe. How many cups of batter are needed?

14. Divide: $159.12 \div 6.8$

15. Divide: $167.67 \div 8.1$