

NAME _____

DATE _____

PERIOD _____

Unit 5, Lesson 10: Using Long Division

Let's use long division.

10.1: Number Talk: Estimating Quotients

Estimate these quotients mentally.

$$500 \div 7$$

$$1,394 \div 9$$

10.2: Lin Uses Long Division

Lin has a method of calculating quotients that is different from Elena's method and Andre's method. Here is how she found the quotient of $657 \div 3$:

Lin arranged the numbers for vertical calculations.

Her plan was to divide each digit of 657 into 3 groups, starting with the 6 hundreds.

$$3 \overline{) 657}$$

There are 3 groups of 2 in 6, so Lin wrote 2 at the top and subtracted 6 from the 6, leaving 0.

Then, she brought down the 5 tens of 657.

$$\begin{array}{r} 2 \\ 3 \overline{) 657} \\ - 6 \quad \downarrow \\ \hline 05 \end{array}$$

There are 3 groups of 1 in 5, so she wrote 1 at the top and subtracted 3 from 5, which left a remainder of 2.

$$\begin{array}{r} 21 \\ 3 \overline{) 657} \\ - 6 \quad \\ \hline 5 \\ - 3 \\ \hline 2 \end{array}$$

She brought down the 7 ones of 657 and wrote it next to the 2, which made 27.

There are 3 groups of 9 in 27, so she wrote 9 at the top and subtracted 27, leaving 0.

$$\begin{array}{r} 219 \\ 3 \overline{) 657} \\ - 6 \quad \\ \hline 5 \\ - 3 \\ \hline 27 \\ - 27 \\ \hline 0 \end{array}$$

- Discuss with your partner how Lin's method is similar to and different from drawing base-ten diagrams or using the partial quotients method.
 - Lin subtracted $3 \cdot 2$, then $3 \cdot 1$, and lastly $3 \cdot 9$. Earlier, Andre subtracted $3 \cdot 200$, then $3 \cdot 10$, and lastly $3 \cdot 9$. Why did they have the same quotient?
 - In the third step, why do you think Lin wrote the 7 next to the remainder of 2 rather than adding 7 and 2 to get 9?

NAME _____

DATE _____

PERIOD _____

2. Lin's method is called **long division**. Use this method to find the following quotients. Check your answer by multiplying it by the divisor.

a. $846 \div 3$

b. $1,816 \div 4$

c. $768 \div 12$

10.3: Dividing Whole Numbers

1. Find each quotient.

a. $633 \div 3$

b. $1001 \div 7$

2. Here is Priya's calculation of $906 \div 3$.

$$\begin{array}{r}
 \\
 3 \overline{) 906} \\
 \underline{- 9} \\
 6 \\
 \underline{- 6} \\
 0
 \end{array}$$

a. Priya wrote 320 for the value of $906 \div 3$. Check her answer by multiplying it by 3. What product do you get and what does it tell you about Priya's answer?

b. Describe Priya's mistake, then show the correct calculation and answer.

NAME

DATE

PERIOD

Lesson 10 Summary

Long division is another method for calculating quotients. It relies on place value to perform and record the division.

When we use long division, we work from left to right and with one digit at a time, starting with the leftmost digit of the dividend. We remove the largest group possible each time, using the placement of the digit to indicate the size of each group. Here is an example of how to find $948 \div 3$ using long division.

$$\begin{array}{r} \overline{) 948} \\ \underline{- 9} \quad \leftarrow 3 \text{ groups of 3 (hundreds)} \\ 4 \\ \underline{- 3} \quad \leftarrow 3 \text{ groups of 1 (ten)} \\ 18 \\ \underline{- 18} \quad \leftarrow 3 \text{ groups of 6 (ones)} \\ 0 \end{array}$$

- We start by dividing 9 hundreds into 3 groups, which means 3 hundreds in each group. Instead of writing 300, we simply write 3 in the hundreds place, knowing that it means 3 hundreds.
- There are no remaining hundreds, so we work with the tens. We can make 3 groups of 1 ten in 4 tens, so we write 1 in the tens place above the 4 of 948. Subtracting 3 tens from 4 tens, we have a remainder of 1 ten.
- We know that 1 ten is 10 ones. Combining these with the 8 ones from 948, we have 18 ones. We can make 3 groups of 6, so we write 6 in the ones place.

In total, there are 3 groups of 3 hundreds, 1 ten, and 6 ones in 948, so $948 \div 3 = 316$.

Lesson 10 Glossary Terms

- long division

NAME _____

DATE _____

PERIOD _____

Unit 5, Lesson 10: Using Long Division

1. Kiran is using long division to find $623 \div 7$.

$$7 \overline{) 623}$$

He starts by dividing 62 by 7. In which decimal place should Kiran place the first digit of the quotient (8)?

- A. Hundreds
- B. Tens
- C. Ones
- D. Tenths

2. Here is a long-division calculation of $917 \div 7$.

$$\begin{array}{r}
 131 \\
 7 \overline{) 917} \\
 \underline{- 7} \\
 21 \\
 \underline{- 21} \\
 7 \\
 \underline{- 7} \\
 0
 \end{array}$$

- a. There is a 7 under the 9 of 917. What does this 7 represent?
- b. What does the subtraction of 7 from 9 mean?
- c. Why is a 1 written next to the 2 from $9 - 7$?

3. Han's calculation of $972 \div 9$ is shown here.

NAME _____

DATE _____

PERIOD _____

$$\begin{array}{r}
 180 \\
 9 \overline{) 972} \\
 \underline{- 9} \\
 72 \\
 \underline{- 72} \\
 0 \\
 \underline{- 0} \\
 0
 \end{array}$$

 a. Find $180 \cdot 9$.

 b. Use your calculation of $180 \cdot 9$ to explain how you know Han has made a mistake.

c. Identify and correct Han's mistake.

4. Find each quotient.

a.

$$5 \overline{) 465}$$

b.

$$12 \overline{) 924}$$

c.

$$3 \overline{) 1107}$$

5. One ounce of a yogurt contains of 1.2 grams of sugar. How many grams of sugar are in 14.25 ounces of yogurt?

- A. 0.171 grams
- B. 1.71 grams
- C. 17.1 grams
- D. 171 grams

(from Unit 5, Lesson 7)

NAME

DATE

PERIOD

6. The mass of one coin is 16.718 grams. The mass of a second coin is 27.22 grams. How much greater is the mass of the second coin than the first? Show your reasoning.

(from Unit 5, Lesson 4)