

## Unit 5 Lesson 10: Using Long Division

### 1 Number Talk: Estimating Quotients (Warm up)

#### Student Task Statement

Estimate these quotients mentally.

$$500 \div 7$$

$$1,394 \div 9$$

## 2 Lin Uses Long Division

### Student Task Statement

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.

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

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.

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

- 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?

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.  $768 \div 12$

**Activity Synthesis**

a.

$$\begin{array}{r} \phantom{3} \overline{282} \\ 3 \overline{)846} \\ \underline{-6} \phantom{0} \\ 24 \\ \underline{-24} \\ 6 \\ \phantom{0} \underline{-6} \\ 0 \end{array}$$

b.

$$\begin{array}{r} \phantom{4} \overline{454} \\ 4 \overline{)1816} \\ \underline{-16} \phantom{0} \\ 21 \\ \phantom{0} \underline{-20} \\ 16 \\ \phantom{0} \underline{-16} \\ 0 \end{array}$$

c.

$$\begin{array}{r} \phantom{12} \overline{64} \\ 12 \overline{)768} \\ \underline{-72} \phantom{0} \\ 48 \\ \phantom{0} \underline{-48} \\ 0 \end{array}$$

### 3 Dividing Whole Numbers (Optional)

#### Student Task Statement

1. Find each quotient.

a.  $633 \div 3$

b.  $1001 \div 7$

c.  $2996 \div 14$

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

$$\begin{array}{r} 320 \\ 3 \overline{) 906} \\ \underline{- 9} \phantom{0} \\ \phantom{0} 06 \\ \phantom{0} \underline{- 6} \\ \phantom{00} 0 \end{array}$$

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.