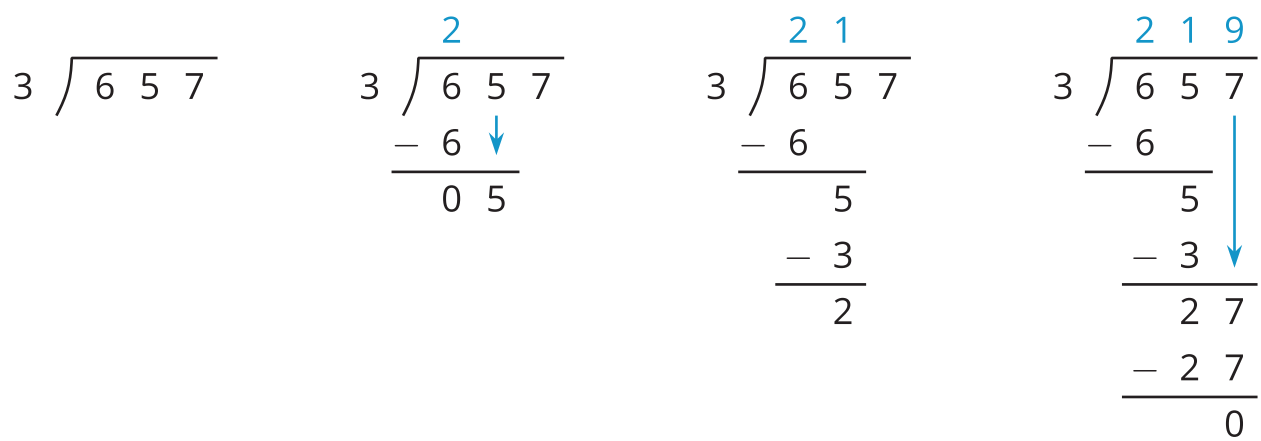
Using Long Division

Let's use long division.

11.1 Notice and Wonder: Lin's Calculations

Here are Lin's calculations for finding $657 \div 3$.



What do you notice? What do you wonder?

11.2 Lin Uses Long Division

Here is how Lin 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.

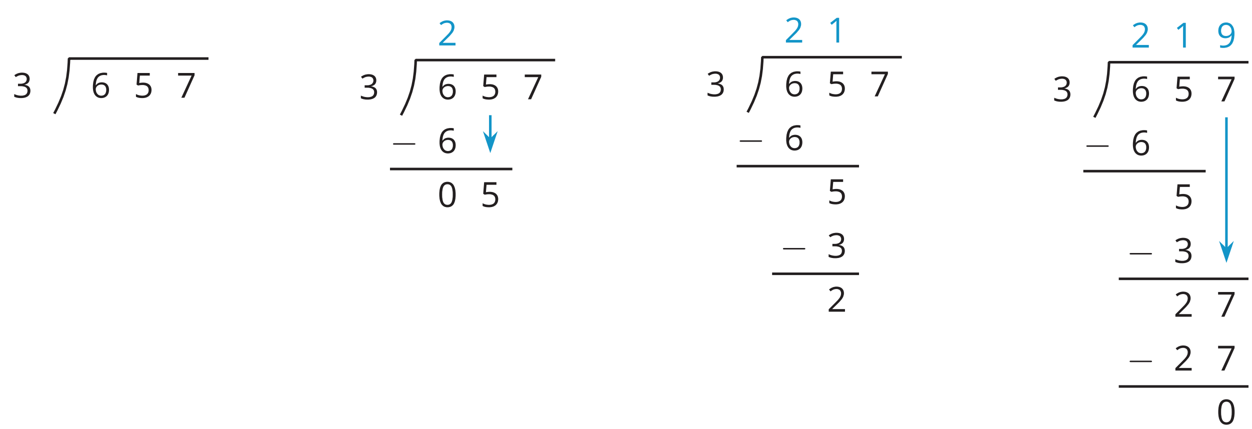
There are 3 groups of 2 in 6, so Lin wrote 2 at the top and subtracted 6 from the 6, leaving 0.

Then, she brought down the 5 tens of 657.

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.

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.



1. Study Lin's steps. Then discuss with your partner:
    a. In the first step, Lin divided 6 by 3 to get 2. Why do you think she put the 2 over the 6?
    b. 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?
    c. 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. $768 \div 12$

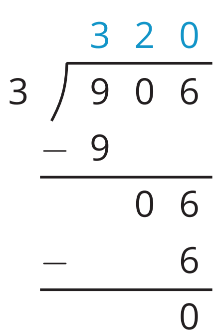
11.3 Dividing Whole Numbers

1. Use long division to calculate each quotient.

    a. $1001 \div 7$

    b. $2996 \div 14$

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



    a. Priya wrote 320 for the value of $906 \div 3$. Check her answer by multiplying it by 3. What product do you get?

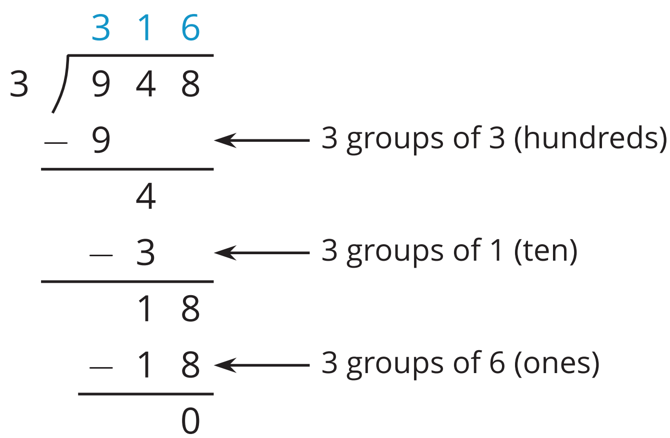
    b. What does the product tell you about Priya's answer? Explain your reasoning. If you think her answer is incorrect, describe the error and show the correct calculation and answer.

Lesson 11 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.



- 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 out of 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 ones, 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 $948 \div 3 = 316$.