Key Vocabulary

common multiples, *p. 28*

least common multiple, *p. 28*

Multiples that are shared by two or more numbers are called **common multiples**. The least of the common multiples is called the **least common multiple** (LCM). You can find the LCM of two or more numbers by listing multiples or using prime factors.

EXAMPLE 1 Finding the LCM Using Lists of Multiples

Find the LCM of 4 and 6.

List the multiples of each number.

Multiples of 4: 4, 8, (12), 16, 20, (24), 28, 32, (36), . . . Circle the common multiples.

Multiples of 6: 6, (12), 18, (24), 30, (36), . . .

Some common multiples of 4 and 6 are 12, 24, and 36. The least of these common multiples is 12.

So, the LCM of 4 and 6 is 12.

Try It **Find the LCM of the numbers using lists of multiples.**

1. 3, 8 **2.** 9, 12 **3.** 6, 10

EXAMPLE 2 Finding the LCM Using Prime Factorizations

Find the LCM of 16 and 20.

Make a factor tree for each number.

Write the prime factorization of each number. Circle each different factor where it appears the greater number of times.

$16 = (2) \cdot (2) \cdot (2) \cdot (2)$ 2 appears more often here, so circle all 2s.

$20 = 2 \cdot 2 \cdot (5)$ 5 appears once. Do not circle the 2s again.

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 = 80$ Find the product of the circled factors.

So, the LCM of 16 and 20 is 80.

Try It **Find the LCM of the numbers using prime factorizations.**

4. 14, 18 **5.** 28, 36 **6.** 24, 90

EXAMPLE 3 Finding the LCM of Three Numbers

Find the LCM of 4, 15, and 18.

Write the prime factorization of each number. Circle each different factor where it appears the greatest number of times.

$4 = (2) \cdot (2)$	2 appears most often here, so circle both 2s.
$15 = 3 \cdot (5)$	5 appears here only, so circle 5.
$18 = 2 \cdot (3) \cdot (3)$	3 appears most often here, so circle both 3s.
$2 \cdot 2 \cdot 5 \cdot 3 \cdot 3 = 180$	Find the product of the circled factors.

So, the LCM of 4, 15, and 18 is 180.

Try It

Find the LCM of the numbers.

7. 2, 5, 8

8. 6, 10, 12

9. Write three numbers that have a least common multiple of 100.

Self-Assessment for Concepts & Skills

Solve each exercise. Then rate your understanding of the success criteria in your journal.

FINDING THE LCM **Find the LCM of the numbers.**

10. 6, 9

11. 30, 40

12. 5, 11

13. MP **REASONING** Write two numbers such that 18 and 30 are multiples of the numbers. Justify your answer.

14. MP **REASONING** You need to find the LCM of 13 and 14. Would you rather list their multiples or use their prime factorizations? Explain.

15. MP **CHOOSE TOOLS** A student writes the prime factorizations of 8 and 12 in a table as shown. She claims she can use the table to find the greatest common factor and the least common multiple of 8 and 12. How is this possible?

8 =	2	2	2		
12 =	2	2		3	

16. **CRITICAL THINKING** How can you use least common multiples to add or subtract fractions with different denominators?

EXAMPLE 4 Modeling Real Life

One firefly flashes every 8 seconds. Another firefly flashes every 10 seconds. Both fireflies just flashed. After how many seconds will both fireflies flash at the same time again?

Understand the problem.

You are given the numbers of seconds between flashes for two different fireflies. You are asked when the fireflies will flash at the same time again.

Make a plan.

The LCM of the numbers of seconds between flashes represents the number of seconds it will take for both fireflies to flash at the same time again. So, find the LCM of 8 and 10 by listing the multiples of each number.

Solve and check.

Multiples of 8: 8, 16, 24, 32, (40), . . .

Multiples of 10: 10, 20, 30, (40), 50, . . .

The LCM of 8 and 10 is 40.

So, both fireflies will flash at the same time again after 40 seconds.

Another Method Find the LCM using prime factorizations.

$8 = (2) \cdot (2) \cdot (2)$ $\quad 10 = 2 \cdot (5)$

So, the LCM is $2 \cdot 2 \cdot 2 \cdot 5 = 40$. ✓

Self-Assessment for Problem Solving

Solve each exercise. Then rate your understanding of the success criteria in your journal.

17. A geyser erupts every fourth day. Another geyser erupts every sixth day. Today both geysers erupted. In how many days will both geysers erupt on the same day again?

18. A water park has two large buckets that slowly fill with water. One bucket dumps water every 12 minutes. The other bucket dumps water every 10 minutes. Five minutes ago, both buckets dumped water. When will both buckets dump water at the same time again?

19. **DIG DEEPER!** You purchase disposable plates, cups, and forks for a cookout. Plates are sold in packages of 24, cups in packages of 32, and forks in packages of 48. What are the least numbers of packages you should buy in order to have the same number of plates, cups, and forks?