# 4–1 A Plan for Problem Solving

**MAIN IDEA**
- Find the greatest common factor of two or more numbers.

## BUILD YOUR VOCABULARY (pages 86–87)

**Venn diagrams** use overlapping circles to show _____ elements. Factors that are shared by _____ or more numbers are called **common factors**.

The _____ of the common factors of two or more numbers is the **greatest common factor (GCF)** of the numbers.

**EXAMPLE** **Find the GCF by Listing Factors**

**1** **Find the GCF of 36 and 48.**

First make an organized list of the factors for each number.

36: $1 \times 36$, $2 \times 18$, $3 \times 12$, $4 \times 9$, $6 \times 6$
→ 1, 2, 3, 4, 6, 9, 12, 18, 36

48: $1 \times 48$, $2 \times 24$, $3 \times 16$, $4 \times 12$, $6 \times 8$
→ 1, 2, 3, 4, 6, 8, 12, 16, 24, 48

The common factors are _____ and the greatest of these is _____.

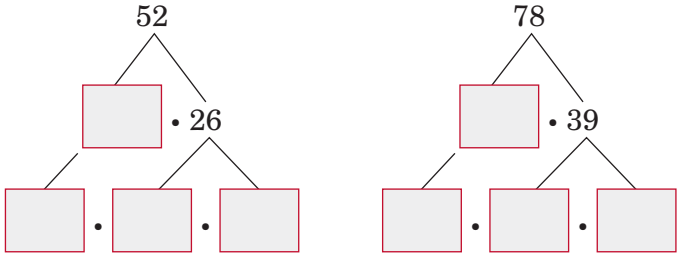
So, the greatest common factor or GCF of 36 and 48 is _____.

**Check Your Progress** Find the GCF of 45 and 75.

**EXAMPLE** **Find the GCF by Using Prime Factors**

**2** **Find the GCF of 52 and 78.**

**METHOD 1** Write the prime factorization.

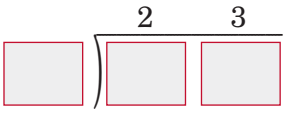


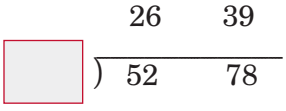

2 and 13 are common factors.

**REMEMBER IT**

Prime factorization is writing a composite number as a product of prime numbers.

**METHOD 2** Divide by prime numbers.




Divide both 52 and 78 by 2. Then divide the quotients by 13.

Using either method, the common prime factors are ☐ and ☐. So, the GCF of 52 and 78 is ☐ × ☐ or ☐.

**Check Your Progress** Find the GCF of 64 and 80.

## EXAMPLES

**3** **SALES** **Anna sells bags of different kinds of cookies. She made $27 selling bags of peanut butter cookies, $18 from chocolate chip cookies, and $45 selling bags of oatmeal cookies. Each bag of cookies costs the same amount. What is the most that Anna could charge for each bag of cookies?**

factors of 18: ____

factors of 27: ____

factors of 45: ____

List all the factors of each number. Then find the GCF.

The GCF of 18, 27, and 45 is ____. So, the most she could charge for each bag is ____.

**4** **How many bags could Anna have sold if each bag costs $9?**

Anna has a total of $27 + $18 + $45 or ____. So, the number of bags sold is $90 ÷ $9 or ____ bags.

**Check Your Progress** **CANDY Sarah made boxes of different kinds of candy for a school fund raiser. She made $24 selling boxes of hard candy, $40 from taffy, and $64 from chocolates. Each box of candy costs the same amount.**

**a.** What is the most that Sarah could charge for each box of candy?

**b.** How many boxes could Sarah have sold if each box costs $8?

## WRITE IT

Why is the greatest common factor of two prime numbers always 1?

## HOMEWORK ASSIGNMENT

Page(s):

Exercises: