

**LESSON**  
**12•1**
**The Division Method for Prime Factorization**


Use the method below to find the prime factorization of the following numbers.

**Example:** Find the prime factorization for 732.

**Step 1** Divide, using the smallest prime factor of the number as the divisor.

**Step 2** The quotient becomes the dividend. Use the smallest prime factor as the divisor, and continue dividing until the quotient is a prime number.

$$2 \overline{)732} \quad \text{Divide: } 732 \div 2 = 366$$

$$2 \overline{)366} \quad \text{Divide: } 366 \div 2 = 183$$

2 is not a factor of 183.  
The next smallest prime factor is 3.

$$3 \overline{)183} \quad \text{Divide: } 183 \div 3 = 61$$

$$\overline{)61} \quad 61 \text{ is a prime number.}$$

The prime factorization of 732 is  
 $2 * 2 * 3 * 61$

**Step 3** Write the divisors as a multiplication expression.

$$\underline{732 = 2 * 2 * 3 * 61}$$

This is the prime factorization of 732.

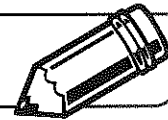
Use the division method to find the prime factorizations. Show your work.

1. 1,056

2. 3,190

3. 24,598

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**LESSON**  
**12·1**
**Factor Trees and Adding Fractions**


1. Make factor trees and write the prime factorization for each number below.

a. 12

b. 42

c. 32

12 = \_\_\_\_\_      42 = \_\_\_\_\_      32 = \_\_\_\_\_

2. Add the following fractions. Use the factor trees above to help you find the least common multiple of the denominators. Use this least common multiple as a common denominator.

a.  $\frac{5}{12} = \frac{\square}{\square}$   
 $+\frac{7}{32} = \frac{\square}{\square}$   
 \_\_\_\_\_

b.  $\frac{41}{42} = \frac{\square}{\square}$   
 $+\frac{1}{12} = \frac{\square}{\square}$   
 \_\_\_\_\_

3. Use factor trees or some other method to find a common denominator for the fraction pairs below. If you do not use factor trees, explain how you found the least common denominators.

a.  $\frac{5}{14}$  and  $\frac{2}{21}$  \_\_\_\_\_

b.  $\frac{7}{18}$  and  $\frac{16}{36}$  \_\_\_\_\_

c.  $\frac{9}{24}$  and  $\frac{21}{64}$  \_\_\_\_\_