

4-1 Study Guide and Intervention

Prime Factorization

A whole number is **prime** if it has exactly two factors, 1 and itself. A whole number is **composite** if it is greater than one and has more than two factors. To determine the **prime factorization** of a number, use a **factor tree**.

Example 1 Determine whether each number is *prime* or *composite*.

a. 11

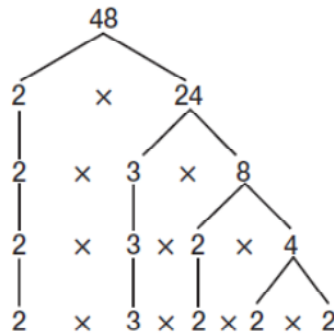
b. 24

a. The number 11 has only two factors, 1 and 11, so it is prime.

b. The number 24 has 8 factors, 1, 2, 3, 4, 6, 8, 12, and 24. So, it is composite.

Example 2 Determine the prime factorization of 48.

Use a factor tree.



The prime factorization of 48 is $2 \times 2 \times 2 \times 2 \times 3$ or $2^3 \times 3$

Exercises

Determine whether each number is prime or composite.

- | | | | |
|------------------------|------------------------|------------------------|------------------------|
| 1. 27 composite | 2. 31 prime | 3. 46 composite | 4. 53 prime |
| 5. 11 prime | 6. 72 composite | 7. 17 prime | 8. 51 composite |

Determine the prime factorization of the following numbers.

- | | | | |
|-------------|--------------------------|-----------------------|--------------|
| 9. 64 2^6 | 10. 100 $2^2 \times 5^2$ | 11. 45 $3^2 \times 5$ | 12. 81 3^4 |
|-------------|--------------------------|-----------------------|--------------|