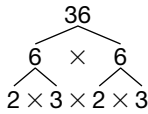


Prime Factorization (pages 138–141)

A **prime number** is a whole number greater than 1 that has exactly two factors, 1 and itself. A **composite number** is a whole number greater than 1 that has more than two factors. Every composite number can be written as the product of prime numbers in exactly one way if you ignore the order of the factors. This product is called the **prime factorization** of the number.

EXAMPLE

Finding Prime Factorization	Method 1: Use a factor tree.	Method 2: Divide by 2, 3, 4, 5, ... until the quotient is prime. Use a calculator, if necessary. $36 \div 2 = 18$; $18 \div 2 = 9$; $9 \div 3 = 3$
	 <p>The prime factorization of 36 is $2 \times 2 \times 3 \times 3$.</p>	

Try These Together

- Is 23 composite or prime?
HINT: Test for divisibility by 2, 3, 5, 7, and 11.
- Use a factor tree to find the prime factorization of 28.
HINT: You can divide by 2 and then by 2 again.

PRACTICE

Determine whether each number is composite or prime.

3. 51 4. 228 5. 227 6. 73 7. 154


Use a factor tree to find the prime factorization of each number.

8. 64 9. 93 10. 54 11. 125 12. 244

Use your calculator to find the prime factors of each number. Then write the prime factorization of each number.

13. 84 14. 96 15. 150
16. 30 17. 232 18. 245

19. **Maps** Rhode Island is the smallest state in the United States. It only covers 3,188 square kilometers. Find the prime factorization of 3,188.

-  20. **Standardized Test Practice** Which number is a factor of both 21 and 36?
A 4 B 3 C 9 D 12

Answers: 1. prime 2. $2 \times 2 \times 7$ 3. composite 4. composite 5. prime 6. prime 7. composite 8. $2 \times 2 \times 2 \times 2 \times 2 \times 2$ 9. $3 \times 3 \times 31$ 10. $2 \times 3 \times 3 \times 3$ 11. $5 \times 5 \times 5$ 12. $2 \times 2 \times 61$ 13. $2 \times 2 \times 3 \times 7$ 14. $2 \times 2 \times 2 \times 2 \times 3$ 15. $2 \times 2 \times 3 \times 5$ 16. $2 \times 3 \times 5$ 17. $2 \times 2 \times 2 \times 2 \times 29$ 18. $5 \times 7 \times 7$ 19. $2 \times 2 \times 2 \times 797$ 20. B