



Name _____ Date _____

Prime Factorization (pages 182–184)

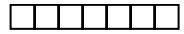
A **composite number** is any whole number greater than one that has more than two factors. For example, 6 is a composite number because its factors are 1, 2, 3, and 6. That's because 1×6 and 2×3 each equal 6.

A number with only 2 factors is a **prime number**. The numbers 0 and 1 are neither prime nor composite.

Every composite number can be expressed as a product of prime numbers. This is called the **prime factorization** of the number. You can use a **factor tree** to find prime factorizations.

EXAMPLES

A Is 7 a prime number?



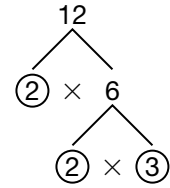
How many rectangles can you make out of 7 squares?

$$1 \times 7$$

Only one rectangle, so the factors of 7 are 1 and 7. Since there are only 2 factors, 7 is a prime number.

B Find the prime factorization of 12.

Use a factor tree.



Factor 12. 12 is divisible by 2. Circle the prime number 2.

Factor 6. 6 is divisible by 2. Circle the prime numbers 2 and 3. The prime factorization is $2 \times 2 \times 3$, or $2^2 \times 3$.

Try These Together

1. Is 22 a prime number?

HINT: Does it have more than 2 factors?

2. Find the prime factorization of 18.

HINT: Use a factor tree to find prime factors.

PRACTICE

Tell whether each number is prime or composite.

- | | | |
|--------|---------|---------|
| 3. 2 | 4. 11 | 5. 14 |
| 6. 13 | 7. 84 | 8. 31 |
| 9. 111 | 10. 187 | 11. 113 |

Find the prime factorization of each number.

- | | | |
|--------|--------|---------|
| 12. 10 | 13. 33 | 14. 87 |
| 15. 54 | 16. 29 | 17. 34 |
| 18. 61 | 19. 57 | 20. 112 |

21. Entertainment A cable system has 42 channels. Express 42 as a product of primes.



22. Standardized Test Practice What is the least prime number greater than 50?

- A** 51 **B** 53 **C** 57 **D** 59

Answers: 1. no 2. 2×3^2 3. prime 4. prime 5. composite 6. prime 7. composite 8. prime 9. composite 10. composite 11. prime 12. 2×5 13. 3×11 14. 3×29 15. 2×3^3 16. 29 17. 2×17 18. prime 19. 3×19 20. $2^4 \times 7$ 21. $2 \times 3 \times 7$ 22. B