NAME_____

Module 4 **Fractions, Decimals, Percents, and Factors**
Lesson 3 **Factors and Prime Factorization**

Lesson Notes 4.3

Lesson Objectives

- Find the factors of a number.
- Determine if a number is prime or composite.
- Find the prime factorization of a composite number.
- Use factors of a number to find common factors of two integers, including finding the Greatest Common Factor (GCF) of two or more integers.
- Use prime factorization to determine the Greatest Common Factor (GCF).

Subtopic 1 Finding the Factors of a Number

- **Factors** divide into a number with no remainder.
- Factors **multiply** to get a product.
- A number greater than one with only the factors one and itself is a **prime number**.
- A number that has more than two factors is a **composite number**.
- **One** and **zero** are neither prime nor composite.

1 Is 6 a factor of 21? Explain the answer.
No. Possible answer: 21 ÷ 6 = 3 R 3. There is a remainder, so six is not a factor of 21.

2 List the factors of 100.
1, 2, 4, 5, 10, 20, 25, 50, 100

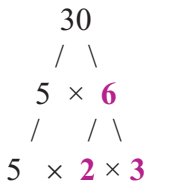
Two is the only even number that is prime.

3 Determine whether each number is prime or composite.

9	**composite**
56	**composite**
29	**prime**

Subtopic 2 Finding the Prime Factorization of a Number

- To **factor** a number is to write it as the product of two or more factors.
- The **prime factorization** of a number shows the number written as the product of prime factors.
- Prime Factorization Using a Factor Tree



$30 = 2 \times 3 \times 5$

- Prime Factorization Using a Factor Ladder

	24
2	12
3	4
2	2

$24 = 2 \times 2 \times 2 \times 3$

- This prime factorization, $75 = 3 \times 5 \times 5$, is written in **expanded** form.
- This prime factorization, $75 = 3 \times 5^2$, is written in **exponential** form.

4 Find the prime factorization of 48.
$48 = 2 \times 2 \times 2 \times 2 \times 3$ or $48 = 2^4 \times 3$

5 Find the prime factorization of 98.
$98 = 2 \times 7 \times 7$ or $98 = 2 \times 7^2$

6 Find the prime factorization of 150.
$150 = 2 \times 3 \times 5 \times 5$ or $150 = 2 \times 3 \times 5^2$

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Subtopic 3 Common Factors and Greatest Common Factor

- A **common factor** is a number that is a factor of two or more numbers.
- The **Greatest Common Factor (GCF)** is the largest common factor of two or more numbers.

7 Find the common factors of 24 and 60.
1, 2, 3, 4, 6, 12

8 Find the GCF of 24 and 60.
12

Subtopic 4 Using the Prime Factorization to Find the GCF

To find the GCF using prime factorization:

- Write the **prime factorization** of each number.
- The GCF is the **product** of the **common** prime factors.

9 Use prime factorization to find the GCF of 50 and 25.
25

10 Use prime factorization to find the GCF of 98, 70, and 42.
14