

Study Guide

Factors and Greatest Common Factor

If two or more numbers are multiplied, each number is a **factor** of the product.

	Definition	Example
Prime Number	A <i>prime number</i> is a whole number, greater than 1, whose only factors are 1 and itself.	5
Composite Number	A <i>composite number</i> is a whole number, greater than 1, that is not prime.	10
Prime Factorization	<i>Prime factorization</i> occurs when a whole number is expressed as a product of factors that are all prime.	$45 = 3^2 \cdot 5$
Greatest Common Factor (GCF)	The <i>greatest common factor</i> of two or more integers is the greatest number that is a factor of the integers.	The GCF of 12 and 30 is 6.

The GCF of two or more monomials is the product of their common factors, when each monomial is expressed in factored form.

Example: Find the GCF of $16xy^2z^2$ and $72xyz^3$.

$$16xy^2z^2 = \underbrace{2 \cdot 2 \cdot 2}_{} \cdot 2 \cdot \underbrace{x \cdot y}_{} \cdot y \cdot \underbrace{z \cdot z}_{} \\ 72xyz^3 = \underbrace{2 \cdot 2 \cdot 2}_{} \cdot 3 \cdot 3 \cdot \underbrace{x \cdot y}_{} \cdot \underbrace{z \cdot z}_{} \cdot z$$

The GCF of $16xy^2z^2$ and $72xyz^3$ is $2 \cdot 2 \cdot 2 \cdot x \cdot y \cdot z \cdot z$, or $8xyz^2$.

**State whether each number is prime or composite.
If the number is composite, find its prime factorization.**

1. 28

2. 61

3. 112

4. 2865

Factor each expression completely. Do not use exponents.

5. -34

6. -150

7. $56pq^3$

8. $-108(cd)^2$

Find the GCF of the given monomials.

9. $-45, 15$

10. $169, 13$

11. $-20, 440$

12. $49x, 343x^2$

13. $4a^7b, 28ab$

14. $96y, 12x, -8y$