



Factoring Polynomials

Factors and Products

The answer to a multiplication problem is called the product. The expressions being multiplied together are called factors. For example, in $2 \cdot 7 = 14$, the product is 14 and the factors are 2 and 7.

Examples

In $2 \cdot 3 = 6$, the product is 6. The factors are 2 and 3.

In $x^2 \cdot x^3 = x^5$, the product is x^5 , and the factors are x^2 and x^3 .

In $2(y + 7) = 2y + 14$, the product is $2y + 14$. The factors are 2 and $y + 7$.

In $(x + 5)(x + 2) = x^2 + 2x + 5x + 10$ (by FOIL), the product is $x^2 + 2x + 5x + 10$. The factors are $(x + 5)$ and $(x + 2)$.

In $(y + 3)(y - 2) = y^2 + y - 6$, the product is $y^2 + y - 6$. The factors are $(y + 3)$ and $(y - 2)$.

The goal of this chapter is to teach you how to find the factors when only the products are known. If the product is a polynomial, the process of finding its factors is called **factoring the polynomial**. To factor polynomials, we need a concept known as the greatest common factor.

The Greatest Common Factor (GCF)

The greatest common factor of two or more numbers is the largest number that divides each number evenly.

To find the GCF of two or more numbers:

Step 1: Write each number as a product of primes.

Step 2: Identify the factors common to each number.

Step 3: Multiply the common factors together.



Review Chapters 1–3

CHAPTER 1

- Plot these ordered pairs:
A. (2,4) B. (-3,1) C. (3,-1) D. (-5,-5) E. (0,-3)
- Which are solutions to $3x - 4y + 1$?
A. (0,2) B. (-1,-1) C. (7,5)
- A. Graph $y = 2x - 3$ by the point plotting method.
B. Graph $-3x + 2y = 6$ by using zeros.
C. Graph $y = -2$.
- Use the slope formula to find the slope of a line which passes through (1,1) and (5,-2).
- Determine the slope and y-intercept of each:
A. $y = 9x + 1$ B. $y = -\frac{1}{2}x - 3$ C. $2x + y = 3$
- Use the slope intercept method to graph the lines in Parts A and B of Exercise 3: that is, $y = 2x - 3$ and $-3x + 2y = 6$.
- Use $y = mx + b$ to find the equation of a line which passes through (2,-1) with the slope of $-\frac{1}{2}$.

CHAPTER 2

Determine whether or not the ordered pairs are solutions to the system.

- $5x - 4y = 2$ 2. $x = y + 2$
 $-2x + y = 1$ $3x - 3y = 6$
A. (2,2) B. (-2,-3) A. (2,0) B. (-5,-3)
- Solve: $5x - 4y = 2$ Using (a.) substitution and (b.) addition methods.
 $-2x + y = 1$
- Solve: $x = y + 2$ By (a.) graphing, (b.) substitution, and
 $3x - 3y = 6$ (c.) addition methods.