

## Lesson 3.1: Factoring Polynomial Expressions (Pre-Calculus 20S Review)

In Pre-Calculus 20S, you learned four main types of factoring to assist you in factoring a polynomial expression.

Example 1: Factor the following expressions:

### 1. Common

$$\begin{aligned} \text{a) } 2x + 14x^3y \\ = 2(x + 7x^3y) \\ = 2x(1 + 7x^2y) \end{aligned}$$

$$\begin{aligned} \text{b) } 8a^5b^2c^3 - 4a^2b^2c + 10a^4b^2c^2 \\ 2a^2b^2c(4a^3c^2 - 2 + 5ac) \end{aligned}$$

### 2. Difference of Squares

$$\begin{aligned} \text{a) } x^2 - 36 \\ a^2 - b^2 = (a-b)(a+b) \\ (x-6)(x+6) \end{aligned}$$

$$\begin{aligned} \text{b) } 81a^4 - 49y^2 \\ (9a^2)^2 - (7y)^2 \\ (9a^2 - 7y)(9a^2 + 7y) \end{aligned}$$

$$\begin{aligned} \text{c) } 18 - 32n^6 \\ 2(9 - 16n^6) \\ 2(3^2 - 4^2n^3) \\ 2(3 - 4n^3)^2 \\ 2(3 - 4n^3)(3 + 4n^3) \end{aligned}$$

### 3. Simple Trinomials (a = 1)

$$\begin{aligned} \text{a) } x^2 + 7x + 10 \\ (x+2)(x+5) \end{aligned}$$

$$\begin{aligned} \text{b) } a^2 - 11a + 18 \\ (a-9)(a-2) \end{aligned}$$

$$\begin{aligned} \text{c) } 3x^2 - 39x - 90 \\ 3(x^2 - 13x - 30) \\ 3(x-15)(x+2) \end{aligned}$$

### 4. Complex Trinomials (a ≠ 1)

$$\begin{aligned} \text{a) } 6x^2 + 19x + 10 \\ \begin{array}{r} 3 \quad 2 \\ 2 \quad 5 \end{array} \\ (3x+2)(2x+5) \end{aligned}$$

$$\begin{aligned} \text{b) } 8x^2 + 10x - 3 \\ \begin{array}{r} 4 \quad 1 \\ 2 \quad 3 \end{array} \\ (4x+1)(2x-3) \end{aligned}$$

$$\begin{aligned} \text{c) } 8x^2 - 14x + 6 \\ 2(4x^2 - 7x + 3) \\ \begin{array}{r} 4 \quad 3 \\ 1 \quad 1 \end{array} \\ 2(4x-3)(x-1) \end{aligned}$$