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Factoring Polynomials Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is the process of breaking down a polynomial into simpler polynomials called?

undefined. A) Expanding

undefined. B) Factoring ✓

undefined. C) Simplifying

undefined. D) Distributing

The process is called factoring.

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The process is called factoring.

Which of the following are types of polynomials? (Select all that apply)

undefined. A) Monomial ✓

undefined. B) Binomial ✓

undefined. C) Trinomial ✓

undefined. D) Quadrinomial

Monomial, Binomial, and Trinomial are types of polynomials.

Which of the following are types of polynomials? (Select all that apply)

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undefined. A) Monomial ✓

undefined. B) Binomial ✓

undefined. C) Trinomial ✓

undefined. D) Quadrinomial

Types of polynomials include monomials, binomials, and trinomials.

Explain what a Greatest Common Factor (GCF) is in the context of factoring polynomials.

The GCF is the largest polynomial that divides each term of the polynomial without leaving a remainder.

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The GCF is the largest polynomial that divides each term of the polynomial.

List the special factoring formulas you know, such as the difference of squares.

1. What is the difference of squares?

$a^2 - b^2 = (a - b)(a + b)$

2. What is a perfect square trinomial?

$(a + b)^2 = a^2 + 2ab + b^2$

3. What is the sum of cubes?

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

Common formulas include the difference of squares, perfect square trinomials, and the sum/difference of cubes.

Part 2: Comprehension and Application

Which of the following expressions can be factored using the difference of squares formula? (Select all that apply)

undefined. A) $x^2 - 9$ ✓

undefined. B) $x^2 + 4x + 4$

undefined. C) $4x^2 - 16$ ✓

undefined. D) $x^2 + 1$

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Expressions that can be factored using the difference of squares include those that can be expressed as a^2 - b^2.

Which of the following expressions can be factored using the difference of squares formula? (Select all that apply)

undefined. A) x^2 - 9 ✓

undefined. B) x^2 + 4x + 4

undefined. C) 4x^2 - 16 ✓

undefined. D) x^2 + 1

Expressions that can be factored using the difference of squares include those that can be expressed as a^2 - b^2.

Describe the process of factoring by grouping and when it is typically used.

Factoring by grouping involves rearranging and grouping terms to factor out common factors, typically used for polynomials with four or more terms.

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Factoring by grouping involves rearranging and grouping terms to factor out common factors.

What is the factored form of x^2 + 5x + 6?

undefined. A) (x + 2)(x + 3) ✓

undefined. B) (x + 1)(x + 6)

undefined. C) (x + 2)(x + 4)

undefined. D) (x + 3)(x + 3)

The factored form is (x + 2)(x + 3).

What is the factored form of x^2 + 5x + 6?

undefined. A) (x + 2)(x + 3) ✓

undefined. B) (x + 1)(x + 6)

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The factored form is $(x + 2)(x + 3)$.

Which of the following polynomials can be factored by taking out a GCF? (Select all that apply)

undefined. A) $3x^2 + 6x$ ✓

undefined. B) $x^2 + 4x + 4$

undefined. C) $5x^3 - 10x^2$ ✓

undefined. D) $x^2 - 1$

Polynomials that can be factored by taking out a GCF include those with a common factor across all terms.

Which of the following polynomials can be factored by taking out a GCF? (Select all that apply)

undefined. A) $3x^2 + 6x$ ✓

undefined. B) $x^2 + 4x + 4$

undefined. C) $5x^3 - 10x^2$ ✓

undefined. D) $x^2 - 1$

Polynomials that can be factored by taking out a GCF include those with common factors.

Factor the polynomial $2x^3 + 4x^2 - 6x$ completely.

The polynomial can be factored as $2x(x^2 + 2x - 3)$.

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Part 3: Analysis, Evaluation, and Creation

Which of the following statements is true about the polynomial $x^2 - 4x + 4$?

undefined. A) It is a difference of squares.

undefined. B) It is a perfect square trinomial. ✓

undefined. C) It cannot be factored.

undefined. D) It is a sum of cubes.

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The polynomial is a perfect square trinomial.

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undefined. C) It cannot be factored.

undefined. D) It is a sum of cubes.

The polynomial is a perfect square trinomial.

Consider the polynomial $x^3 - 3x^2 - 4x + 12$. Which of the following are possible first steps in factoring this polynomial? (Select all that apply)

undefined. A) Factor by grouping ✓

undefined. B) Use the difference of squares

undefined. C) Take out a GCF ✓

undefined. D) Use the sum of cubes

Possible first steps include factoring by grouping and taking out a GCF.

Consider the polynomial $x^3 - 3x^2 - 4x + 12$. Which of the following are possible first steps in factoring this polynomial? (Select all that apply)

undefined. A) Factor by grouping ✓

undefined. B) Use the difference of squares

undefined. C) Take out a GCF ✓

undefined. D) Use the sum of cubes

Possible first steps include factoring by grouping or taking out a GCF.

Analyze the polynomial $x^4 - 16$ and explain how it can be factored completely.

The polynomial can be factored as $(x^2 - 4)(x^2 + 4)$ and then further as $(x - 2)(x + 2)(x^2 + 4)$.

Analyze the polynomial $x^4 - 16$ and explain how it can be factored completely.

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The polynomial can be factored as (x^2 - 4)(x^2 + 4) and then further as (x - 2)(x + 2)(x^2 + 4).

Which of the following factored forms is correct for the polynomial x^3 + 3x^2 - 4x - 12?

undefined. A) (x + 3)(x^2 - 4)

undefined. B) (x - 3)(x^2 + 4)

undefined. C) (x + 3)(x - 2)(x + 2) ✓

undefined. D) (x - 3)(x + 2)(x - 2)

The correct factored form is (x + 3)(x - 2)(x + 2).

Evaluate the following statements about factoring and select the true ones. (Select all that apply)

undefined. A) Every polynomial can be factored into linear factors. ✓

undefined. B) Factoring is the reverse process of expanding. ✓

undefined. C) A polynomial with no real roots cannot be factored.

undefined. D) Factoring is useful for solving polynomial equations. ✓

True statements include that every polynomial can be factored into linear factors and that factoring is useful for solving polynomial equations.

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Create a polynomial that can be factored using both the difference of squares and factoring by grouping. Provide the polynomial and its factored form.

An example polynomial is x^4 - 16, which can be factored as (x^2 - 4)(x^2 + 4) and then (x - 2)(x + 2)(x^2 + 4).

Create a polynomial that can be factored using both the difference of squares and factoring by grouping. Provide the polynomial and its factored form.

An example polynomial is x^4 - 16, which can be factored as (x^2 - 4)(x^2 + 4) and then (x - 2)(x + 2)(x^2 + 4).

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