Simplifying Rational Expressions Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is a rational expression?

undefined. A fraction with integers in the numerator and denominator

undefined. A fraction where both the numerator and the denominator are polynomials ✓

undefined. A polynomial with no fractions

undefined. A fraction with only variables in the numerator

A rational expression is a fraction where both the numerator and the denominator are polynomials.

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Which of the following are examples of rational expressions?

undefined. \(\frac{x+2}{x-3}\) ✓

undefined. \(x^2 + 5x + 6\)

undefined. \(\frac{3}{4}\) ✓

undefined. \(\frac{x^2 + 1}{x^2 - 4}\) ✓

Examples of rational expressions include fractions with polynomials in both the numerator and denominator.

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Examples of rational expressions include fractions where both the numerator and denominator are polynomials.

Explain the process of simplifying a rational expression. What steps are involved?

The process involves factoring the numerator and denominator, identifying common factors, and cancelation.

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The process involves factoring the numerator and denominator and cancelation of common factors.

List the common factoring techniques used in simplifying rational expressions.

1. What is the greatest common factor?

The largest factor that divides two or more numbers.

2. How do you factor a trinomial?

By finding two numbers that multiply to the constant term and add to the linear coefficient.

3. What are some examples of special products?

Difference of squares, perfect square trinomials.

Common techniques include factoring out the greatest common factor, factoring trinomials, and recognizing special products.

Part 2: Understanding and Interpretation

Which factoring technique would you use first to simplify the expression \(\frac{x^2 - 4}{x^2 - 3x}\)?

undefined. Factoring out the greatest common factor

undefined. Factoring trinomials

undefined. Recognizing a difference of squares ✓

undefined. Completing the square

The first technique to use is recognizing a difference of squares in the numerator.

Which factoring technique would you use first to simplify the expression \(\frac{x^2 - 4}{x^2 - 3x}\)?

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undefined. Factoring trinomials
undefined. Recognizing a difference of squares ✓
undefined. Completing the square

The first technique to use is recognizing a difference of squares.

Identify the restrictions for the rational expression \(\frac{x+1}{x^2 - 1}\).

undefined. \(x \neq 1\) ✓
undefined. \(x \neq -1\) ✓
undefined. \(x \neq 0\)
undefined. \(x \neq 2\)

The restrictions are values that make the denominator equal to zero, which are \(x \neq 1\) and \(x \neq -1\).

Identify the restrictions for the rational expression \(\frac{x+1}{x^2 - 1}\).

undefined. \(x \neq 1\) ✓
undefined. \(x \neq -1\) ✓
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The restrictions are values that make the denominator equal to zero.

Describe why it is important to identify restrictions in the domain of a rational expression.

Identifying restrictions is crucial because it prevents division by zero, which is undefined.

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Identifying restrictions is crucial to avoid undefined expressions and ensure valid operations.

Part 3: Application and Analysis

Simplify the rational expression $\frac{x^2 - 9}{x^2 - 3x}$ and choose the correct simplified form.

undefined. $\frac{x+3}{x}$

undefined. $\frac{x-3}{x}$ ✓

undefined. $\frac{x+3}{x-3}$

undefined. $\frac{x-3}{x+3}$

The correct simplified form is $\frac{x-3}{x}$.

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The correct simplified form is $\frac{x-3}{x}$.

Given the expression $\frac{x^2 + 5x + 6}{x^2 - 4}$, which of the following steps are part of the simplification process?

undefined. Factor the numerator as $(x+2)(x+3)$ ✓

undefined. Factor the denominator as $(x-2)(x+2)$ ✓

undefined. Cancel the common factor $(x+2)$ ✓

undefined. Rewrite the expression as $\frac{x+3}{x-2}$ ✓

The steps include factoring the numerator and denominator and cancelation of common factors.

Given the expression $\frac{x^2 + 5x + 6}{x^2 - 4}$, which of the following steps are part of the simplification process?

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The steps include factoring the numerator and denominator and cancelation of common factors.

Apply the process of simplifying rational expressions to $\frac{x^2 - 4x + 4}{x^2 - 2x}$ and explain each step.

The process involves factoring the numerator and denominator, identifying common factors, and cancelation.

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The process involves factoring the numerator and denominator and cancelation of common factors.

What is the zero of the numerator in the expression $\frac{x^2 - 9}{x^2 - 3x}$ after simplification?

undefined. $x = 3$ ✓
undefined. $x = -3$
undefined. $x = 0$
undefined. $x = 1$

The zero of the numerator is $x = 3$ after simplification.

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The zero of the numerator is $x = 3$ after simplification.

Part 4: Evaluation and Creation

Evaluate the correctness of the simplification: $\frac{x^2 - 1}{x^2 - x - 2} = \frac{x+1}{x-2}$. Is this simplification correct?

undefined. Yes
undefined. No ✓
undefined. Choice 3

undefined. Choice 4

The simplification is incorrect; the correct simplification is different.

Consider the expression \(\frac{x^2 + 2x + 1}{x^2 - 1}\). Which of the following are true after simplification?

undefined. The expression simplifies to \(\frac{x+1}{x-1}\) ✓

undefined. The expression has a hole at \(x = -1\) ✓

undefined. The expression has a vertical asymptote at \(x = 1\) ✓

undefined. The expression is equivalent to \(\frac{x+1}{x+1}\)

After simplification, the expression has a hole at \(x = -1\) and a vertical asymptote at \(x = 1\).

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undefined. The expression is equivalent to \(\frac{x+1}{x+1}\)

After simplification, the expression has a hole and a vertical asymptote.

Create a rational expression that has a hole at \(x = 2\) and a vertical asymptote at \(x = -3\). Explain your reasoning and the steps you took to construct this expression.

A rational expression with a hole at \(x = 2\) could be \(\frac{(x-2)(x+3)}{(x-2)(x+3)}\) and a vertical asymptote at \(x = -3\) could be \(\frac{(x-2)}{(x+3)}\).

Create a rational expression that has a hole at \(x = 2\) and a vertical asymptote at \(x = -3\). Explain your reasoning and the steps you took to construct this expression.

A rational expression can be constructed by including factors that create a hole and a vertical asymptote.