

Rational Expressions

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Pre-Calculus Mathematics for Business and
Economics

Sub-Topics

1. Rational Expressions and their Domain
2. Rational Expressions and Complex Fractions
3. Solve a Rational Expression
4. Simplify a Multivariate Expression
5. Quadratic Factoring
6. Polynomial Long Division
7. Binomials and Quadratic Factoring

Rational Expressions and their Domain

A rational expression is a ratio (quotient, division) of two polynomials such as $\frac{x+5}{x^2-9}$.

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The **domain of a rational expression** is all real numbers except those that make the denominator equal to zero.

$$\frac{x + 5}{x^2 - 9} =$$

Rational Expressions and their Domain: Find all values of x that are NOT in the domain of g . If there is more than one value, separate them with commas.

$$g(x) = \frac{x^2 - 17x + 72}{x^2 - 4}$$

Rational Expressions and Complex Fractions – simplify:

$$\frac{\frac{8}{49} - \frac{1}{x^2}}{\frac{1}{7} + \frac{1}{x}}$$

Solve a Rational Expression – solve for w :

$$-\frac{3}{2w-12} - 1 = -\frac{7}{w-6}$$

Simplify a Multivariate Expression – simplify:

$$\frac{4y^6 + 8x^6y^5}{4wy^3}$$

Quadratic Factoring – simplify

$$\frac{\frac{9 - x^2}{3x}}{\frac{15 - 5x}{4x^3}}$$

Polynomial Long Division:

$$(12x^3 - 23x^2 + 4x + 1) \div (3x - 2)$$

see Khan Academy for a good intro on polynomial division.

<https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-div/x2ec2f6f830c9fb89:poly-div-by-x/v/polynomial-division-intro>

Polynomial Long Division:

$$(12x^3 - 23x^2 + 4x + 1) \div (3x - 2)$$

Binomials and Quadratic Factoring – Solve for y :

$$-\frac{6}{y+1} = -6 - \frac{1}{y-1}$$