Complex Rational Expressions

Complex Rational Expression: if the numerator or denominator, or both numerator and denominator of a rational algebraic expression is also a rational algebraic expression

A rational algebraic expression is said to be in its simplest form when the numerator and denominator are polynomials with no common factors other than 1.

How to Simplify Complex Rational Expressions:

1. Find the LCD of all the denominators.
2. Multiply all the terms of the complex rational expression by the LCD.
3. Simplify the expression.

Practice Exercises

Simplify the following complex rational expressions.

1. $\dfrac{\frac{1}{x}-\frac{1}{y}}{\frac{1}{x^2}+\frac{1}{y^2}}$
2. $\dfrac{\frac{x-y}{x+y}-\frac{y}{x}}{\frac{x}{y}+\frac{x-y}{x+y}}$
3. $\dfrac{1+\frac{2}{x}}{1+\frac{2}{x^2}}$
4. $\dfrac{\frac{a}{a-b}+\frac{a}{a+b}}{\frac{b}{a-b}+\frac{a}{a+b}}$
5. $\dfrac{4-\frac{4}{y^2}}{2+\frac{2}{y}}$

Problem Set

Simplify the following complex rational expressions.

1. $\dfrac{x+\frac{x}{y}}{1+\frac{1}{y}}$
2. $\dfrac{1+\frac{3^x}{x+3}}{x+\frac{3^x}{x-3}}$
3. $\dfrac{x+\frac{x}{y}}{y-\frac{y}{x}}$
4. $\dfrac{\frac{1}{a-2}-\frac{3}{a-1}}{\frac{5}{a-2}+\frac{2}{a-1}}$
5. $\dfrac{\frac{y+1}{y}}{\frac{y-1}{2y}}$

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