

Rational Expressions and Equations

To find non-permissible values, equate denominator to 0

When simplifying:

- factor first (look for common factors, PSF, difference of squares)
- identify non-permissible values
- if multiplying, divide by common factors
- if dividing, flip (identify new non-permissible values), divide by common factors
- if adding/subtracting, need a common denominator

***Note:** when solving you **MUST** check all possible answers

Reciprocal functions:

- graph the original function
- draw a vertical line at the x -intercepts, also known as the vertical asymptote(s)
- determine the invariant points ($y = 1$ and $y = -1$)
- graph the reciprocal graph
 - if the expression is linear (hyperbola)
 - if the expression is quadratic
 - funnel (1 vertical asymptote)
 - H-shape (2 vertical asymptotes)
 - Bump (No vertical asymptotes)

1. Identify non-permissible values: $\frac{x+1}{x^2-4x-5}$

2. Simplify: $\frac{2x^2-8x}{x-4}$

3. Simplify: $\frac{x^2-9}{2x+8} \div \frac{x-3}{x^2+5x+4}$

4. Simplify: $\frac{4x+3}{(x+1)(x-1)} + \frac{x}{(x-1)}$

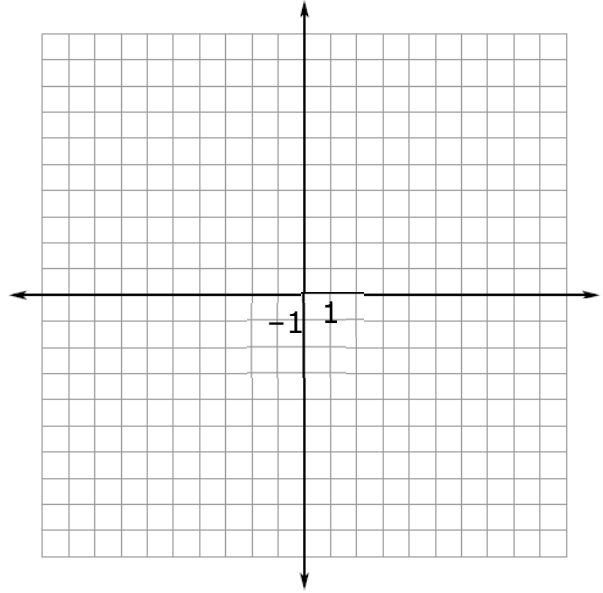
5. Simplify: $\frac{x^2-100}{144} \times \frac{36}{x+10}$

6. Simplify: $\frac{3x}{x+2} - \frac{x}{x-2}$

7. Solve: $\frac{3}{x} + \frac{4}{x^2} = 1$

8. Solve: $\frac{6}{x-3} = \frac{x+3}{x^2-9} - 5$

9. Graph the function: $y = \frac{1}{x^2-9}$



10. Graph the function: $y = \frac{1}{-2x-5}$

