

C1 SIMPLIFY / NPV's

- Factor numerators and denominators.
 - Greatest common factor (GCF)
 - Difference of squares
 $a^2 - b^2 = (a - b)(a + b)$
- State NPV's.
 - Make each factor in the denominator equal to zero and solve.
- Cancel common factors in the numerator and denominator.

Example:

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

NPV's: $x \neq 0, x + 2 \neq 0$
 $x \neq -2$

$$\frac{\cancel{(x + 2)}(x - 2)}{2x\cancel{(x + 2)}}$$

$$\frac{x - 2}{2x}$$

- Factor numerators and denominators, and state NPV's.
- Cancel common factors in the numerator and denominator.
- Simplify. Multiply numerators and multiply denominators.

C2 MULTIPLY

Example:

$$\frac{x^2 - 9}{6x} \times \frac{4x^2}{x - 3}$$

NPV's: $x \neq 0, x \neq 3$

$$\frac{\cancel{(x - 3)}(x + 3)}{3\cancel{(2x)}} \times \frac{(2x)\cancel{(2x)}}{\cancel{x - 3}}$$

$$\frac{2x(x + 3)}{3}$$

$$\frac{A}{B} \cdot \frac{C}{D} = \frac{AC}{BD}$$

NPV's

Rational Expressions

C4 ADD / SUBTRACT

- Factor and state NPV's. Simplify each term if possible.
- Get common denominator. Remember, you must multiply the denominator and numerator by the same number.
- Add numerators. Denominator does not change.

Example:

$$\frac{7}{x^2 + 2x} - \frac{6}{2x + 4}$$

$$\frac{7}{x(x + 2)} - \frac{6}{2(x + 2)}$$

NPV's: $x \neq -2, x \neq 0$

$$\frac{7 \times 2}{2x(x + 2)} - \frac{6x}{2x(x + 2)}$$

$$\frac{14 - 6x}{2x(x + 2)}$$

- Factor numerators and denominators.
- State NPV's. **Use both denominators and numerator of the second fraction to find NPV's.**
- Multiply by the reciprocal of the second term.
- Simplify.

Example:

$$\frac{12}{2x + 5} \div \frac{4x - 12}{6x + 15}$$

$$\frac{12}{2x + 5} \div \frac{4(x - 3)}{3(2x + 5)}$$

NPV's: $x \neq 3, x \neq -\frac{5}{2}$

$$\frac{\cancel{4} \times 3}{2x + 5} \times \frac{3\cancel{(2x + 5)}}{\cancel{4}(x - 3)}$$

$$\frac{3 \times 3}{x - 3}$$

$$\frac{9}{x - 3}$$

$$\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \cdot \frac{D}{C}$$

NPV's

Review: Solve Linear and Quadratic Equations

↳ Solve Linear Equations (Degree = 1)

- Expand and combine like terms
- Isolate variable

eg. $3(x+2) - 1 = 5x$

$$3x + 6 - 1 = 5x$$

$$3x + 5 = 5x$$

$$-2x = -5$$

$$x = \frac{5}{2}$$

↳ Solve Quadratic Equations (Degree = 2)

- To solve $ax^2 + bx + c = 0$, use

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

or Factoring!

Rational Equations

Solve Rational Equations

- Factor and state NPVs. Simplify, if possible.
- Write each term with a lowest common denominator (LCD)
- Eliminate denominators by multiplying both sides of the equation by LCD.
- Solve resulting equation (Linear or Quadratic)
- Check solution(s) in original equation.

Contextual Problems

- Use information from ? to assign variables and create an equation. (A chart is often useful)
- Solve equation from previous step.
- Check solution(s) and see if they make sense.

Common Problems

Time Working Together / Independently

	Time (unit)	Fraction done in 1 unit
#1	$x + 10$	$\frac{1}{x+10}$
#2	x	$\frac{1}{x}$
Together	90	$\frac{1}{90}$

$$\frac{1}{x+10} + \frac{1}{x} = \frac{1}{90}$$

Speed-Distance-Time

	Speed	Distance	Time
#1			
#2			

$s = \frac{d}{t}$
 $t = \frac{d}{s}$
 $d = s \cdot t$

Profit

$$\text{Profit} = \text{Revenue} - \text{Expenses}$$