

Simplify / npv's

Text pg. 223-224: 9a, 10, 11a, 16
pg. 229-231: 1-9, 13
+ Handouts

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

Example:

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

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

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

$$\text{Npv's: } 2x \neq 0, x + 2 \neq 0$$

$$x \neq 0, x \neq -2$$

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

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

Rational Expressions

Add / Subtract

Text pg. 249-250: 3-9
+ Handouts

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

Example:

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

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

$$\text{Npv's: } x \neq -2, x \neq 0$$

$$7 \times 2 \quad 6 \times$$

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

$$14 - 6x$$

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

Multiply

Text pg. 238-239: 2ab, 4ac, 5a, 6
+ Handouts

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

Example:

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

$$\text{Npv's: } x \neq 0, x \neq 3$$

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

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

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

NPV's

Divide

Text pg. 238-239: 4bd, 5b, 7
+ Handouts

Example:

$$\frac{12}{2x + 5} \div \frac{8x + 20}{6x + 15}$$

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

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

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

$$3 \times 3$$

$$x - 3$$

$$9$$

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

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

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 $a \cdot x^2 + b \cdot x + c = 0$, use

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

or Factoring!

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.

pg. 259-260: 10, 12, 14, 18, 16

Solve Rational Equations

- Factor and state NPVs. Simplify, if possible.
- Write each side of equation as a single rational expression ... $\frac{A}{B} = \frac{C}{D}$
- Cross Multiply ... $A \cdot D = B \cdot C$
- Solve resulting equation (Linear or Quadratic)
- Check solution(s) in original equation.

eg. $\frac{5}{x+4} - \frac{2}{x+1} = \frac{2}{x+2}$

$$\frac{5}{x+4} = \frac{2}{x+2}$$

$$3(x+2) = 2(x+4)$$

$$3x+6 = 2x+8$$

$$x = 2$$

check...

Rational Equations

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			$s = \frac{d}{t}$
#2			$t = \frac{d}{s}$

$$d = s \cdot t$$

Profit

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

pg. 258: 1, 4-7 ; Solving Rational Equations Handout