

# Rational Expressions and Equations

## 1010 Final Review Session

Review at least one problem from each section

\*Problems taken from: Beginning and Intermediate Algebra, by Tyler Wallace is licensed under a Creative Commons Attribution 3.0 Unported License. <http://wallace.ccfaculty.org/book/book.html>.

Intermediate Algebra 9th Edition, by Marvin L. Bittinger & David J. Ellenbogen (Publisher Pearson)

### 1) Part I: Solving Equations

Solve for x:

$$\frac{-9x}{x^2 - 9} + \frac{2}{x + 3} = \frac{1}{x - 3}$$

2) Solve for x:

$$\frac{x}{x-6} + \frac{1}{x-7} = \frac{-3x - 8}{x^2 - 13x + 42}$$

### 3) Part II: Simplifying Expressions

Simplify:

$$\frac{2y - 6}{y^2 - 9} - \frac{y}{y - 1} + \frac{y^2 + 2}{y^2 + 2y - 3}$$

4) Simplify:

$$\frac{x}{x^2 + 5x + 6} - \frac{2}{x^2 + 3x + 2}$$

5) Part III: Simplifying Complex Rational Expressions

Simplify

$$\frac{1 - \frac{2}{3x}}{x - \frac{4}{9x}}$$

6) Simplify

$$\frac{\frac{2}{a^2 - 1} + \frac{1}{a + 1}}{\frac{3}{a^2 - 1} + \frac{2}{a - 1}}$$

7) Part IV: Word Problems involving rational equations

The Black River's current is 6 mph. A boat travels 50 miles downstream in the same time that it takes to travel 30 miles upstream. What is the speed of the boat in still water?

8) A local bus travels 7 mph slower than the express. The express travels 45 miles in the time that it takes the local to travel 38 miles. Find the speed of each bus.

9) Tony does a job in 16 hours less time than Marissa, and they can do it together in 15 hours. How long will it take each to do the job alone?

10) Catherine can paint a house in 15 hours. Dan can paint it in 30 hours. How long will it take them working together?