



**Objective:** Solving rational equations


**Homework RF-4** – NYA p.695 #1, 3, 7, 10, 16, 18, 23, 49, 51

**Do Now: Simplify**

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

**Exam Prep:** Which is not a factor of  $12x^2 - 8x$ ?

- a)  $2x$       b)  $3x - 2$       c)  $4$       d)  $8x$

	<p>Rational Functions look ugly but they have an inner beauty. Here there is nothing new again... just a lot of stuff together. My bowtie is quite lovely, isn't it?</p>
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**Solving Rational Equations**

To solve rational equations, you will have to come in with an open mind with your algebra skills. Use the same technique from the last lesson, get an LCD.

Solve $\frac{x}{2} + \frac{3}{10} = \frac{1}{5}$	$\frac{10}{1} \left( \frac{x}{2} \right) + \frac{10}{1} \left( \frac{3}{10} \right) = \frac{10}{1} \left( \frac{1}{5} \right)$	$5x + 3 = 2$
LCD of 2, 10, 5 = 10.	Use the <b>LCD</b> Multiply Sides by <b>10</b> and use Distributive Property	Easy! $x = \frac{1}{5}$
1. $\frac{1}{2x} + \frac{3}{10} = \frac{1}{5x}$	2. $\frac{1}{3} + \frac{1}{3y} = \frac{1}{6}$	3. $\frac{4}{c} = \frac{3}{2c} - \frac{1}{5}$

Sometimes you have to bring a problem to familiar territory: factoring quadratics

$\frac{5}{x^2} = \frac{6}{x} - 1$	$x^2 \left( \frac{5}{x^2} \right) = x^2 \left( \frac{6}{x} \right) - x^2(1)$	$5 = 6x - x^2$	$x^2 - 6x + 5 = 0$ <b>Factor &amp; Solve</b>
LCD = $x^2$	Use the <b>LCD</b> Distributive Property	<b>Quadratic!</b> Standard Form?	$(x - 5)(x - 1) = 0$ <b><math>x = 5</math> or <math>x = 1</math></b>
1. $\frac{5}{m} = \frac{2}{m^2} + 2$	2. $t - 2 = \frac{8 - 2t}{t - 1}$		

## Solving Rational Proportions: CROSS-MULTIPLY!

$\frac{2}{x} = \frac{1}{x+4}$	$(2)(x+4) = (1)(x)$	$2x + 8 = x$	$x = -8$	<b>Practice</b>	
Proportion	Cross Products	Distribute	<b>Solved!</b>	$\frac{3}{a} = \frac{5}{a-2}$	$\frac{n}{5} = \frac{4}{n+1}$

**Special Case:** Sometimes when you solve a rational equation using quadratics, you get an extraneous (extra and useless) solution. Check both answers. If one of them causes a zero denominator, it is an extraneous solution. Throw it out!

1. $\frac{-2}{x-2} = \frac{x-4}{x^2-4}$	2. $\frac{2}{c^2} = \frac{2}{c^2+1}$	3. $\frac{w}{w-1} = \frac{1}{w-1}$
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