

RATIONAL EQUATIONS



NOTE: everyone will be working on the equation in their own notebook!

- Solve & Check the equation
- Write down notes & procedure for what your group did to solve
- Copy the work & procedure onto the large paper

Be sure your answer checks before the work is handed in!

Strategy 1: LCD

$$\frac{y \cdot y}{y-1} = \frac{8(y)}{y} + \frac{1}{y-1}$$

$$\frac{y^2}{y(y-1)} = \frac{8y-8+y}{y(y-1)}$$
~~$$\frac{y^2 - 9y + 8}{y(y-1)} = 0$$~~

$$y^2 - 9y + 8 = 0$$

{8} y = 8, 1

Strategy 2: Cancel Denoms

~~$$y \left(\frac{y}{y-1} \right) = \frac{8}{1} + \frac{1}{y-1} y$$~~
~~$$y \left(\frac{y^2}{y-1} \right) = 8(y-1) + \frac{y}{y-1} y$$~~

$$y^2 = 8y - 8 + y$$

$$y^2 = 9y - 8$$

$$y = 8, 1$$

Strategy 3: Combine Common

Denoms

~~$$\frac{y}{y-1} = \frac{8}{y} + \frac{1}{y-1}$$~~

~~$$\frac{y-1}{y-1} = \frac{8}{y}$$~~

$$1 = \frac{8}{y}$$

$$y = 8$$

Warm Up

ready.set.
go! 

Simplify: $\frac{3a+1}{(a+1)(a-1)} - \frac{1}{(a+1)(a-1)}$

$$\frac{3a+1-a+1}{(a+1)(a-1)} = \frac{2a+2}{(a+1)(a-1)} = \frac{2(a+1)}{(a+1)(a-1)}$$

More examples:

1) $\frac{4x}{x-3} = 2 + \frac{12}{x-3}$

2) $\frac{5}{x} + \frac{3}{5x} = 1$

$\frac{2}{a-1}$

$\frac{-12}{x-3} - \frac{-12}{x-3}$

$\frac{10+3}{5x} = 1$

$\frac{4x-12}{x-3} = 2$

$5x \cdot \frac{13}{5x} = 1 \cdot 5x$

$\frac{4(x-3)}{x-3} = 2$
 $4 \neq 2$

$13 = 5x$
 $\left\{ \frac{13}{5} \right\} = x$

3) $\frac{1}{x+3} - \frac{2}{3-x} = \frac{4}{x^2-9}$

$\frac{1(x-3)}{(x+3)(x-3)} - \frac{-2(x+3)}{(x+3)(x-3)} = \frac{4}{(x+3)(x-3)}$

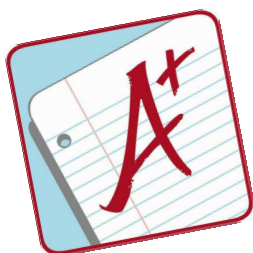
$\frac{x-3+2x+6}{(x+3)(x-3)} = \frac{4}{(x+3)(x-3)}$

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

$\frac{3x-1}{(x+3)(x-3)} = \frac{0}{1}$

$0 = 3x - 1$

$1 = 3x$
 $\frac{1}{3} = x$



REGENTS QUESTIONS 6/2016:

Solve for x:

$$3 \cdot \frac{1}{x} - \frac{1 \cdot x}{3x} = -\frac{1}{3x}$$

$$\frac{\textcircled{3} - x}{3x} = -\frac{1}{3x}$$

$$+ \frac{\textcircled{0}}{3x} \qquad + \frac{1}{3x}$$

~~$$\frac{4-x}{3x} = 0$$~~

$$0 = 4 - x$$

$$\textcircled{x = 4}$$

When is cross-multiplying an appropriate method to solve a rational equation?
Homework: p. 69 #17-20

Developing Skills

In 3–20, solve each equation and check.

$$17. 1 = \frac{5}{x+3} + \frac{5}{(x+2)(x+3)}$$

$$18. \frac{a-1}{4} = \frac{8}{a+3}$$

$$19. \frac{4}{y+2} = 1 - \frac{8}{y(y+2)}$$

$$20. \frac{4}{3b-2} - \frac{7}{3b+2} = \frac{1}{9b^2-4}$$