

Name: _____
 PC: Solving Rational Equations

Date: _____
 Ms. Loughran

Do Now:

1. Simplify: $\frac{(x+2) \cdot 4}{(x+2)(x-2)} + \frac{x(x-2) \cdot 4}{(x+2)(x-2)(x-2)(x+2)} = \frac{x^2+2x+8}{(x-2)(x+2)} \quad x \neq \pm 2$

Examples

1. Solve: $\frac{7x}{x} + \frac{2x}{7} = \frac{8}{x}$
 $28 + 2x = 56$
 $2x = 28$
 $x = 14$

2. $\frac{6x+18}{x+3} = \frac{5}{1}$
 $6x+18 = 5x+15$
 $x = -3$
 reject

no solution
 or
 \emptyset
 or
 $\{ \}$

3. $\frac{(x+5)(x-5) \cdot 2x}{x+5} + \frac{1(x+5)(x-5) \cdot 10}{x-5} = \frac{(x-5)(x+5)}{x^2-25}$

$2x^2 - 10x + x + 5 = 10$
 $2x^2 - 9x - 5 = 0$
 $2x^2 - 10x + x - 5 = 0$
 $2x(x-5) + 1(x-5) = 0$
 $(x-5)(2x+1) = 0$
 $x = 5$ reject $x = -\frac{1}{2}$

Steps for solving rational equations:

1. Find an LCD

2. multiply through by that LCD
 (your denominators should disappear at this point)

3. solve resulting equation

* make sure to reject any values that would make any of the fractions undefined *

$$10. \frac{2}{q} = \frac{q-1}{3}$$

$$6 = q^2 - q$$

$$0 = q^2 - q - 6$$

$$0 = (q-3)(q+2)$$

$$\boxed{q=3 \quad | \quad q=-2}$$

$$27. \frac{3d^2}{\cancel{2d-1}} + \frac{3d-4}{\cancel{2d-1}} = \frac{-2}{\cancel{2d-1}}$$

$$3d^2 + 3d - 4 = -4d + 2$$

$$3d^2 + 7d - 6 = 0$$

$$3d^2 + 9d - 2d - 6 = 0$$

$$3d(d+3) - 2(d+3) = 0$$

$$(3d-2)(d+3) = 0$$

$$\boxed{d = \frac{2}{3} \quad | \quad d = -3}$$

$$32. \frac{\overset{(b+3)(b-3)}{b+3}}{\cancel{3-b}} + \frac{\overset{(b+3)(b-3)}{3b+1}}{b^2-9} = \frac{\overset{(b+3)(b-3)}{1-5b}}{\cancel{b+3}}$$

$$-1(\overset{(b+3)(b-3)}{b+3}) + 3b+1 = \overset{(b+3)(b-3)}{(1-5b)(b-3)}$$

$$-(b^2+6b+9) + 3b+1 = b-5b^2-3+15b$$

$$-b^2-6b-9+3b+1 = -5b^2+16b-3$$

$$-b^2-3b-8 = -5b^2+16b-3$$

$$4b^2-19b-5 = 0$$

$$4b^2-20b+b-5 = 0$$

$$4b(b-5) + 1(b-5) = 0$$

$$(b-5)(4b+1) = 0$$

$$\frac{b-5}{b} \mid b = -\frac{1}{4}$$

Homework 12-16

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PC :More Practice with Asymptotes

Ms. Loughran

Function	Hole(s)	Vertical Asymptote(s)	Horizontal Asymptote	Oblique Asymptote	x-intercept(s)	y-intercept
$y = \frac{(x-2)(x+1)}{x+1}$ $y = \frac{x^2 - x - 2}{x+1}$	$(-1, -3)$	none	none	none	$(2, 0)$	$(0, -2)$
$y = \frac{x+3}{x^2+9}$	none	none	$y=0$	none	$(-3, 0)$	$(0, \frac{1}{3})$
$y = \frac{(x-3)(x+2)}{x^2-x-6}$ $(x-5)(x+4)$	none	$x=5, -4$	$y=1$	none	$(3, 0)$ $(-2, 0)$	$(0, \frac{2}{10})$
$y = \frac{(x-5)(x+3)}{x^2-2x-15}$ x	$(5, 8)$	none	none	none	$(-3, 0)$	$(0, 3)$
$y = \frac{x+3}{2x}$ $0 = \frac{x+3}{2x} \quad 0 = x+3$	none	$x=0$	$y = \frac{1}{2}$	none	$(-3, 0)$	none
$y = \frac{x(x-3)}{3x^2+6x}$ $3x(x+2)$	$(0, \frac{1}{2})$	$x=-2$	$y = \frac{1}{3}$	none	$(3, 0)$	none

$$0 = \frac{x-3}{3(x+2)}$$

$$0 = \frac{x-3}{3x+6}$$

$$x-3=0$$

$$x=3$$

$$y = \frac{-3}{6}$$

Function	Hole(s)	Vertical Asymptote(s)	Horizontal Asymptote	Oblique Asymptote	x-intercept(s)	y-intercept
$y = \frac{x+2}{2x+1}$ $y = \frac{\cancel{(x-3)}(x+2)}{x^2-x-6}$ $(2x+1)\cancel{(x-3)}$	$(3, \frac{5}{7})$	$x = -\frac{1}{2}$	$y = \frac{1}{2}$	none	$(-2, 0)$	$(0, 2)$
$y = \frac{(x-1)\cancel{(x+1)}}{x^2-1}$ $y = \frac{x-1}{2x^2+x-1}$ $(2x-1)\cancel{(x+1)}$	$(-1, \frac{2}{3})$	$x = \frac{1}{2}$	$y = \frac{1}{2}$	none	$(1, 0)$	$(0, 1)$
$y = \frac{x^4(x-3)\cancel{(x+1)}}{x^3-12x^2+32x}$ $y = \frac{x^2-2x-8}{(x-4)(x+2)}$	$(4, -\frac{3}{3})$	$x = -2$	none	$y = x-10$	$(0, 0)$ $(8, 0)$	$(0, 0)$
$y = \frac{(x-7)(x-2)}{x^2-9x+14}$ $(x+2)(x+1)$	none	$x = -2, -1$	$y = 1$	none	$(7, 0)$ $(2, 0)$	$(0, 7)$
$y = \frac{5+2x^2}{2-x-x^2}$ $-x^2-x+2$ $-(x^2+x-2)$ $-(x+2)(x-1)$	none	$x = -2, 1$	$y = -2$	none	none	$(0, \frac{5}{2})$
$y = \frac{(x-3)\cancel{(x+2)}}{x^2-x-6}$ $y = \frac{x-3}{x^3-4x^2-7x+10}$ $(x-1)(x-5)\cancel{(x+2)}$	$(-2, -\frac{5}{21})$	$x = 1, 5$	$y = 0$	none	$(3, 0)$	$(0, -\frac{3}{5})$

$(-3)(-7)$

$y = \frac{x^2-7x}{x+2}$
 $x(x-7)$

$-2 \mid \begin{array}{ccc} 1 & -8 & 0 \\ & -2 & 20 \\ \hline 1 & -10 & 20 \end{array}$

$5+2x^2=0$
 $2x^2=-5$
 $x^2=-\frac{5}{2}$

$\begin{array}{r} \underline{1 \ 1 \ -4 \ -7 \ 10} \\ \underline{ \ -3 \ -10 \ 0} \\ 1 \ -3 \ -10 \ 0 \end{array}$
 $(x-1)(x^2-3x-10)$
 $(x-1)(x-5)(x+2)$