Wednesday 1/22/20

1. Grab Notes/Calc
2. Take out HW/Calendar
3. Begin Warm-up (5min)

4. Solve Rational Equations Notes

What am I learning today? Date: 1/22/20

S.W.B.A.T. find & factor common denominators of rational equations I.O.T. find excluded values & solve rational equations.

Topic: Solving Rational Equations **Name:** _____

What am I learning today?

Warm-Up

Find the LCD:

1) $\frac{num}{2x-1}$ $\frac{num}{x+5}$ LCD: $(x+5)(2x-1)$

2) $\frac{num}{x^2+4x}$ $\frac{num}{x+4}$ LCD: $x(x+4)$

3) $\frac{num}{2x-3}$ $\frac{num}{2x-3}$ LCD: $(2x-3)$

Vocabulary

Excluded Value

When dividing, we can never divide by 0. Similarly, we can't divide by 0 with Rational Expressions/Equations. So, we must find any excluded **values** of a rational equation before beginning to solve. These values will tell us which values of x will give us "0" in the denominator. So, whenever you have a variable in the denominator, you must check for **excluded values.**

Example: Find the excluded value(s) of the following equation.

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

$2x-1=0$, $+1 \quad +1$, $2x=1$, $x \neq \frac{1}{2}$

$x+5=0$, $-5 \quad -5$, $x \neq -5$

Steps for Solving

1) Find/Name any excluded values.
2) Factor the denominator if possible, then find the LCD.
3) Multiply each term by the LCD. The result should be an equation with NO denominator.
4) Solve the equation for the variable. Be sure to eliminate any existing excluded values.

Solving

Solve the following equations, check for any excluded values

A. $\frac{2}{2x-1} = \frac{-5}{x+5}$ E.V: $x \neq \frac{1}{2}$, $x \neq -5$

$\frac{2}{2x-1} \cdot \frac{x+5}{x+5} = \frac{-5}{x+5} \cdot \frac{2x-1}{2x-1}$

$\frac{2x+10}{(x+5)(2x-1)} = \frac{-10x+5}{(x+5)(2x-1)}$

$2x+10 = -10x+5$, $+10x \quad -10 \quad +10x \quad -10$, $\frac{12x}{12} = \frac{-5}{12}$, $x = \frac{-5}{12}$

B. $\frac{11x-2}{2x-3} - \frac{7x+23}{2x-3} = \frac{6x-9}{2x-3}$ E.V: $2x-3=0$, $+3 \quad +3$, $\frac{2x}{2} = \frac{3}{2}$, $x \neq \frac{3}{2}$

$11x-2-(7x+23) = 6x-9$

$11x-2-7x-23 = 6x-9$

$4x-25 = 6x-9$, $-4x \quad -4x$, $-25 = 2x-9$, $+9 \quad +9$, $\frac{-16}{2} = \frac{2x}{2}$, $-8 = x$

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Solving Examples (CONT)

C. $\frac{8x}{x-2} = \frac{x^2+7x}{x-2}$

$8x = x^2 + 7x$

$-8x \quad -8x$

$0 = x^2 - x$

$0 = x(x-1)$

E.V:

$x - 2 = 0$

$x \neq 2$

$x = 0$

$x - 1 = 0$

$x = 1$

D. $\frac{3x}{2} + \frac{2}{3} = \frac{-4}{3}$ ·2 ·2

$\frac{9x}{6} + \frac{4}{6} = \frac{-8}{6}$

$9x + 4 = -8$

$-4 \quad -4$

$9x = -12$

$\frac{9x}{9} = \frac{-12}{9}$

$x = -\frac{12}{9} = -\frac{4}{3}$

E. $\frac{5x}{x+1} = 4 - \frac{5}{x+1}$ ·1 ·(x+1)

$5x = 4x + 4 - 5$

$5x = 4x - 1$

$-4x \quad -4x$

$x = -1$

E.V:

$x + 1 = 0$

$x \neq -1$

NO Solution

F. $\frac{x+1}{x^2-2x-8} + \frac{3}{x+2} = \frac{2}{x-4}$

$(x-4)(x+2)$

$x^2 = 2a - 8$

$(a-4)(x+2)$

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

$x + 1 + 3x - 12 = 2x + 4$

$4x - 11 = 2x + 4$

$-2x + 11 \quad -2x + 11$

$\frac{2x}{2} = \frac{15}{2}$

$x = \frac{15}{2}$

E.V:

$x - 4 = 0$

$x \neq 4$

$x + 2 = 0$

$x \neq -2$

Summary
Summarize the lesson in your own words