6.1 Rational Expressions and Functions: Multiplying and Dividing

6.2 Rational Expressions and Functions: Adding and Subtracting

6.3 puts it all together into one problem.

6.4 Now we have equations involving rational expressions, so now we have properties of equality!!

Name some differences between an equation and an expression.

Equations have = signs, expressions do not.

With equations you can use properties of equality, with expressions you can not.

(expressions you generally have to use magic ones in order not to change the value of the expression)

What is a rational equation? What are some differences between rational equations & rational expressions and how we treat them?

Def: A **rational equation** is an equation that has at least one rational expression in it.

We have seen these before!!

$$x=1$$

Ex: $\frac{1}{2}x+\frac{1}{3}=\frac{5}{6}$

So if you do not want to have any fractions in your equation, use the LCD to get rid of them!

$$y=-6$$

Ex: $\frac{2}{3}-\frac{1}{y}=\frac{5}{6}$

Be sure to check your answer into the original equation!!

Ex: $\frac{12}{15}-\frac{1}{3x}=\frac{4}{5}$

No Sol. Or $∅$

Ex: $t+\frac{6}{t}=-5$

$$t=-3,-2$$

$$x=-1,-2$$

$$a=1,-2$$

Ex: Solve for x and a. $\frac{3}{x}+\frac{x}{x+2}=\frac{4}{x^{2}+2x}$ & $\frac{1}{a}+\frac{a}{a+2}=\frac{4}{a^{2}+2a}$

$$x=-3$$

Ex: Solve for x. $\frac{2}{x-2}+\frac{1}{x+4}=\frac{x}{x^{2}+2x-8}$

$$a=3/5$$

Ex: Find all values of $"a"$ for which $\left(a\right)=5$ ; $f\left(x\right)=\frac{6}{x}-\frac{6}{2x}$

Ex: Find all values of $"a"$ for which $f\left(a\right)=g(a)$

$$a=-7/3$$

$$f\left(x\right)=\frac{2x+5}{x^{2}+4x+3}, g\left(x\right)=\frac{x+2}{x^{2}-9}+\frac{x-1}{x^{2}-2x-3}$$

Ex: Solve for $a:$ $\frac{3}{a^{2}-7a+10}=\frac{2}{a-2}+\frac{1}{a-5}$

No Sol. Or $∅$

Ex: If time- Sketch the graph of the function $g\left(x\right)=\frac{x^{2}-4}{x-2}$