AA5-3 Investigation Name ________________________________

Adding/Subtracting Rational Expressions

We know that fractions cannot be added or subtracted unless they have a common denominator. In other words, the pieces must be the same size. If they do not have the same denominator we have to find a common denominator and modify each fraction.

Example: $\frac{3}{5}+\frac{7}{2}$ The denominators are not the same. The LCM of 5 and 2 is 10.

Multiply each fraction by 1 so that they have a common denominator (10).

$$\left(\frac{\mathbf{2}}{\mathbf{2}}\cdot\frac{3}{5}\right)+\left(\frac{7}{2}\cdot\frac{\mathbf{5}}{\mathbf{5}}\right)=\frac{6}{10}+\frac{35}{10}$$

Then add and simplify if possible.

$$\frac{6}{10}+\frac{35}{10}=\frac{6+35}{10}=\frac{41}{10}$$

Practice with these:

$\frac{2}{3}+\frac{5}{12}=$ $\frac{7}{6}-\frac{4}{15}=$ $\frac{3}{7}+\frac{4}{9}=$

The same approach applies to algebraic fractions.

$$\frac{2x+1}{4x^2}+\frac{x+3}{8x}$$

<u>Things to think about:</u>

What is a common multiple of $4x^2$ and $8x$? ________

What do you need to multiply each fraction by to get a common denominator?

Distribute before you add.

Frequently with rational expressions to get a common denominator you to multiply the denominators together.

Example: $\frac{-4}{x+3}+\frac{2x}{x-1}$

$(\frac{(x-1)}{(x-1)}\cdot\frac{-4}{(x+3)}) + (\frac{2x}{(x-1)}\cdot\frac{(x+3)}{(x+3)})$ Only distribute in the numerators.

Leave the denominators in factored form.

Try this one: $\frac{x}{(x+4)} - \frac{3}{(x-4)}$

You may need to factor the denominators to find the lowest common denominator:

$\frac{4}{x^2+5x+6}+\frac{2x}{x+2}$

$x^2 + 5x + 6 =$