Adding Algebraic Equations

Adding algebraic fractions	$\frac{1}{3x+6} + \frac{5}{x+2}$
Always factor the DENOMINATOR first	$\frac{1}{3(x+2)} + \frac{5}{(x+2)}$
Use every factor, Only as many times as necessary	
Make **ONE** common denominator Make the bottoms the same	$\overline{3(x+2)}$

FIX the numerators

Multiply out everything in the numerator. Then combine like terms.

Beware of subtraction!!

The very last step to adding fractions is reducing.
Factor the numerator to see if you can REDUCE the fraction.

$\frac{x+5}{3x^2} - \frac{3x-1}{6x}$	Beware of subtraction! Change to addition and change the signs to what follows. If a fraction follows the subtraction, change **all** the signs in the numerator.
$\frac{x+5}{3*x*x} + \frac{-3x+1}{2*3*x}$	When subtracting fractions, you need to find a common denominator. To find the "smallest" common denominator, use the LCM. Look at all the factors in the denominator, only use the common factors once, but then you must also use all the uncommon factors as well.
$\left(\frac{2}{2}\right)\frac{(x+5)}{3*x*x} + \frac{(-3x+1)}{2*3*x}\left(\frac{x}{x}\right)$	The LCM is $6x^2$
$\frac{2x+10+-3x^2+x}{6x^2}$	Fix the fraction so that each fraction has the LCM in the denominator. To do this, you multiply both the numerator and the denominator by the missing factors of the LCM that the original denominator does not have
$\frac{-3x^2+3x+10}{6x^2}$	Make sure you clear all parentheses and combine all like terms in the numerator before you try to reduce fraction
	You can never reduce terms!

Perform the indicated operation and reduce if possible.

$$\frac{2}{x^2-4x+4} + \frac{5}{x^2-4} + \frac{3}{x^2+4x+4}$$

Factor all the denominators

$$\frac{2}{(x-2)(x-2)} + \frac{5}{(x-2)(x+2)} + \frac{3}{(x+2)(x+2)}$$

To find the "smallest" common denominator, use the LCM. Look at all the factors in the denominator. Only use the common factors once, then, you must also use all the uncommon factors as well.

The LCM is $(x-2)(x-2)(x+2)(x+2)$

Fix the fractions so that each fraction has the LCM in the denominator. To do this, multiply both the numerator and the denominator by the missing factors of the LCM that the original denominator did not have

$$\frac{2(x+2)(x+2)}{(x-2)(x-2)(x+2)(x+2)} + \frac{5(x-2)(x+2)}{(x-2)(x+2)(x-2)(x+2)} + \frac{3(x-2)(x-2)}{(x+2)(x+2)(x-2)(x-2)}$$

FOIL then distribute the numerator. Be sure to clear all parentheses and combine like terms

$$\frac{2(x^2+4x+4)}{(x-2)(x-2)(x+2)(x+2)} + \frac{5(x^2-4)}{(x-2)(x-2)(x+2)(x+2)} + \frac{3(x^2-4x+4)}{(x-2)(x-2)(x+2)(x+2)}$$

$$\frac{2x^2+8x+8+5x^2-20+3x^2-12x+12}{(x-2)(x-2)(x+2)(x+2)}$$

$$\frac{10x^2-4x}{(x-2)(x-2)(x+2)(x+2)}$$

To reduce fractions that contain "plus" signs, you MUST factor, then you can reduce factors.

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

You can NEVER reduce terms!