Steps Reasons and Rules for Algebraic Problems

All algebraic problems must be done in a vertical format (all the equal signs line up in one column.) Each line must have only one step EXCEPT that the arithmetic step and some notation steps can be combined with any other step. The reason must be given for each step and must be one from the following list.

Step	Abbreviation	Explanation and comments
Arithmetic	Arith.	Doing any arithmetic that is possible, this includes taking powers or roots.
Change of Notation	Not.	This step is shifting from one notation to another way of writing the same thing. In this class we will use this step in changing back and forth between: 1) Subtracting and 'adding the opposite.' 2) Dividing and 'multiplying by the reciprocal.'
Distributive Property	Dist.	A special kind of simplification that needs its own step. $a(b + c)$ becomes $ab + ac$.
Multiplying by one	Mult. by 1	Used when getting common denominators. This step is usually NOT used on equations.
Exponent Property	Prop	This reason is used with one of the many exponent properties.
FOIL	FOIL	A more general use of the distributive property. Used when multiplying binomials together.
Substitution (evaluation)	Sub.	Exchanging a 'letter' for an expression that it equals. Primarily used in evaluating expressions and in solving systems of equations. Also used when applying formulas.
Factoring	Fact.	Breaking an expression up into its factors. This is usually done in preparation for using the Zero Factor Property or the Fundamental Property of Rational Numbers.
Fundamental Principle of Rational Numbers	Reduce	This principle states that a number divided by itself (not zero) is one ($a/a = 1$ if a is not zero.)

The following steps can ONLY be used on Equations.		
Golden Rule	GRule	Add/Subtract/Multiply/Divide the same expression to both sides of an equation.
Zero Factor Property	0-Fact.	This is a logic step. If ab = 0 then ($\rightarrow$) a = 0 or b = 0. This is used when solving nonlinear equations.

A sample problem using the required form:

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

$$\frac{1}{2} = x - 3x - 6 \qquad \text{Dist.}$$

$$\frac{1}{2} + 6 = -2x - 6 + 6 \qquad \text{G Rule}$$

$$\frac{1}{2} + 6\left(\frac{2}{2}\right) = -2x \qquad \text{Mult by 1 and Arith.}$$

$$\frac{13}{2} = -2x \qquad \text{Arith.}$$

$$\frac{13}{2}\frac{1}{-2} = -2x\frac{1}{-2} \qquad \text{G Rule}$$

$$-\frac{13}{4} = x \qquad \text{Arith.}$$