MA 220, Lesson 5
Sections 2.1 and 6.6
Solving Linear and Rational Equations

Definition: A **linear equation** in one variable x is an equation that can be written in the standard form below where a and b are real numbers with $a \neq 0$. It is also sometimes called a first-degree equation.

$$ax + b = 0$$

To **solve** an equation for x means to find the value that will satisfy the equation (make the equation true). This is done by isolating x on one side (rewriting in the form x = a number).

Solve each linear equation.

Ex 1: $13 - x = 3(2x - 4) - 6x$

Ex 2: $8(6 - 3x) = -5(x + 4) + 3x$

Sometimes it is wise to 'clear' fractions or decimals by multiplying both sides of the equation by the same number.

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

Ex 4: $0.6x + 2.8 = x - 3.5$

If a variable is in a denominator of an equation, it is called a rational equation. You must always ***exclude*** those values of a variable that make any denominator equal to zero. Do this before solving and refer to your exclusions before determining the solution.

Ex 5: $\frac{7}{8}-\frac{16}{x-2}=\frac{3}{4}$

Ex 6: $\frac{1}{y-1}+\frac{5}{12}=\frac{-2}{3(y-1)}$

Ex 7: $\frac{3x+2}{x-4}=\frac{6x+3}{2x-7}$

Ex 8: $\frac{6}{w+3}-\frac{7}{w-5}=\frac{-48}{(w+3)(w-5)}$

Ex 9: $\frac{7x}{x-3}=9+\frac{21}{x-3}$