SOLVING RATIONAL EQUATIONS

Example: When we solved equations involving fractions, we eliminated the fractions by

Example: Find the least common denominator of the following pairs of fractions:

a) $\frac{1}{3t}$ and $\frac{1}{5t^2}$

b) $\frac{x}{8}$ and $\frac{3x}{2}$

c) $\frac{4}{3h^2}$ and $\frac{2}{h^3}$

d) $\frac{4}{2z^2+2z}$ and $\frac{5z}{z+1}$

e) $\frac{4}{y+2}$ and $\frac{3+y}{y-1}$

f) $\frac{1}{k+2}$ and $\frac{3k}{k^2-4}$

g) $\frac{7x-6}{x^2-7x-8}$ and $\frac{3x}{2x^2-19x+24}$

Example: Solve the following equations.

a) $\frac{a}{3}+\frac{a}{5}=4$

b) $\frac{5}{4x}+\frac{2}{3}=\frac{1}{x}$

Finding the LEAST common denominator will help you eliminate the fractions in an equation. However, when you multiply both sides of an equation by an algebraic expression you create the possibility of *extraneous solutions*. Extraneous solutions are answers that you will get by following all the correct steps, but they do not work in the original equation. For the purposes of this lesson, usually this occurs when you find an answer that creates a 0 in the denominator of the original problem.

Example: Solve the following equations. Check for extraneous solutions.

a) $\frac{3}{x+2}=\frac{4}{x-3}$

b) $\frac{5}{2x-2}=\frac{15}{x^2-1}$

c) $\frac{2}{x-3}-\frac{4}{x+3}=\frac{8}{x^2-9}$

d) $\frac{n}{n^2+2n}+\frac{1}{n}=\frac{3}{n+2}$

e) $\frac{3x}{x+5}+\frac{1}{x-2}=\frac{7}{x^2+3x-10}$

f) $\frac{2}{x-3}-\frac{3}{4-x}=\frac{2x-2}{x^2-x-12}$