Solving Rational Equations

Summary

1. Multiplying every term by the least common denominator will eliminate all rational expressions.
2. Watch out for values that cause the denominator to equal 0. **You don't want these values in your answer.**

In this section we will look at solving equations containing rational functions.

- We will eliminate our fractions by multiplying everything on both sides by the least common denominator.
- However, because our fractions contain variables in the denominator, we must remember that the **denominator can never equal zero**.
- Thus, we must always check for *extraneous solutions* when solving rational equations and inequalities.

Example 1. Solve each. Don't forget to check for extraneous solutions.

(a) $\dfrac{x+4}{2x} + \dfrac{x+20}{3x} = 3$

(b) $\dfrac{x+6}{2x} + \dfrac{x+24}{5x} = 2$

(c) $\dfrac{x+1}{x+10} = \dfrac{x-2}{x+4}$

(d) $\dfrac{x-3}{x+1} = \dfrac{2}{x+6}$

(e) $\dfrac{2x}{x-3} + \dfrac{6}{x+3} = \dfrac{-28}{x^2-9}$

(f) $\dfrac{3}{x-3} + \dfrac{5}{x-4} = \dfrac{x^2-20}{x^2-7x+12}$