# Solving Rational Equations I

1. Solve each of the equations for $x$, using algebra (no calculator).

a) $\frac{5}{x} = 7$

b) $\frac{5}{x+2} = 7$

c) $\frac{6}{2x+1} = x$

d) $\frac{4}{x-3} = x$

e) $\frac{6}{x+2} = x+1$

f) $\frac{12}{x+2} = x-9$

g) $\frac{3}{x+2} = \frac{5}{x-8}$

h) $\frac{x+9}{x-2} = \frac{5}{7}$

i) $\dfrac{x+1}{x-3} = \dfrac{x+4}{x-2}$

j) $\dfrac{x+1}{x+2} = \dfrac{4x+18}{2x+31}$

2. Do you understand that in each equation from the previous exercises, each side of the equation was one of the following?

   - A rational expression
   - A polynomial

   (Yes or No)

3. The size of an insect population (in thousands per acre) is modeled by $P(x) = \dfrac{5x+2}{x+1}$ where $x$ is the time in months since April 1.

   a) Evaluate $P(3)$ and interpret the result with a sentence in context.

   b) Graph $P$ using your graphing calculator and zoom out a lot. What happens to the insect population in the long run? Give a sentence with context.

   c) When will the insect population reach 4.5 thousand per acre? Solve this using pencil and paper only. Then write a sentence with context.

   d) What is the domain of this function $P$? There are two things to consider: the algebraic restrictions on what would be a valid input for the given formula, and the restrictions that have to do with the context of the problem. There is more than one "correct" answer to this question, but be sure to use interval notation.