

# Formulas and Word Problem Strategies

Math 130 *Kovitz* 2012

A **formula** is a rule—often given by an equation—for doing a certain kind of calculation.

## Steps for Solving a Formula for a Given Letter (linear case)

1. Get rid of fractions by multiplying both sides of the equation by the least common denominator of the fractions.
2. Get rid of parentheses by using the distributive property.
3. Collect like terms on each side of the equation. This may require factoring if a variable is in more than one term.
4. Move all terms with the letter to be solved for to one side of the equation and all other terms to the other side of the equation.
5. Collect like terms again, if necessary.
6. If the letter being solved for only appears to the first power, factor it out and proceed to the next step. Otherwise, if the letter appears to the first and second powers, treat this as a quadratic in that letter and apply methods used to solve a quadratic equation.
7. Divide both sides of the equation by the coefficient of the letter in question.

## Strategies for Solving Word Problems

1. Decide what relationships hold among the pieces of information given.
2. Determine what we are ultimately trying to find. Introduce variables with that in mind for it and other related quantities. (Translate words to math.)
3. Make a list or a table or draw a figure and assign to the members of the list, entries in the table, or the parts of the figure suitable expressions built from the variables that were introduced.
4. Write equations that relate the members of the list, entries in the table, or parts of the figure, and rewrite them in terms of the variable expressions assigned.
5. Using substitution, if appropriate, reduce the number of variables in the equations as much as possible.
6. Solve the equation, or equations.
7. Apply the solutions to the list, table, or figure to get the solution(s) to the original problem.
8. Check all proposed solutions verbally in the original problem. (Translate math to words.)