A Guide to Solving Application Problems

Step 1: Read Read through the problem in its entirety at least twice. The second time through, take note of the *facts* you are told and the *unknown(s)* that you will be required to find.

Step 2: Name Give letter names to the unknown(s) in the problem. Be sure that you clearly define each unknown.

Step 3: Draw Draw a sketch or digram that illustrates the situation that is being described (if applicable).

Step 4: Organize List out all known facts that you discover by reading through the problem carefully and equations that relate the known and unknown quantities together. If necessary, consult references to find equations that relate to the problem you are solving.

Step 5: Build Combine the facts and equations from the previous step into a single equation that expresses the variable you are trying to find in terms of other known quantities. You final equation should only have one variable (later when we get to more complicated application problems, there may be more than one variable and more than one equation).

Step 6: Solve Use algebraic methods to solve the equation you built above in order to find the unknown quantity.

Step 7: Check Verify that the solution you found satisfies *both* the equation(s) you found earlier *and* the stated conditions of the original problem. If so, hooray! If not, go back and try to find your error.

Step 8: Conclude Once you are confident that you have the correct solution, state your conclusion in a complete sentence, making sure to relate the numerical answer back to the original real world situation.

Some Key Formulas:

- *Area Formulas:* rectangle: $A = \ell \cdot w$, triangle: $A = \frac{1}{2}bh$, circle: $A = \pi r^2$.

- *Vocabulary:*

  - An *equilateral triangle* has three sides of equal length and three equal angles.
  - An *isosceles triangle* has two sides of equal length. The angles opposite the equal sides are equal angles.
  - A *right triangle* has a pair of sides that are perpendicular (the two sides form a 90° angle).
  - A pair of *complementary angles* sum to 90°. A pair of *supplementary angles* sum to 180°.

- *The Pythagorean Theorem:* In a right triangle with hypotenuse of length c and legs of length a and b, $c^2 = a^2 + b^2$

- *Simple Interest:* $A = Prt$, where $P =$ principle invested, $r =$ interest rate, and $t =$ time invested.

- *Simple Motion:* $d = rt$, where $d =$ distance traveled, $r =$ rate, and $t =$ time period.

Example: Suppose that a certain investment has an average return of 10% annually. How much would you have today if you invested $50,000 one year ago?

Solution: Let $P =$ initial amount invested, $r =$ rate of return, and $A =$ final amount 1 year later.
Then $P = \$50,000$, $r = 10\% = 0.10$, and A is unknown.
Therefore, $A = \$50,000 + (\$50,000)(0.10) = \$50,000 + \$5,000 = \$55,000$.

Check: $\$55,000 - (0.01)(\$50,000) = \$55,000 - \$5,000 - \$50,000$.

If you had invested $50,000 one year ago, then you would have $55,000 today.