0. Read the problem and underline key terms.

Ex: Find the dimensions of the largest rectangular area you can enclose if you have 80 ft of fencing.

1. Draw and label a diagram. Introduce notation and clearly state what each variable represents.

2. Write down equations/functions for any quantities mentioned. If a fixed value is given/known, write it down.

3. Clearly state the following sentence, filling in the appropriate equations:

Maximize(or Minimize) <u>FUNCTION for QUANTITY</u>
to be optimized

subject to <u>CONSTRAINT(S)</u>.

4. Use the CONSTRAINT(S) to write the QUANTITY FUNCTION as a function of ***one*** variable only.
It is often helpful to <u>***simplify***</u> *the function before differentiating.*

5. Determine the domain for this function.

6. Use Calculus techniques to find the absolute maximum (or minimum) values.

<u>Ex:</u> Suppose the pen is going to be built next to a barn so that one side does not need fencing. Find the dimensions of the largest rectangular area you can enclose if you have 80 ft of fencing.

<u>Ex:</u> Suppose a pen enclosing 3600 ft^2 is to be constructed with fencing on all four sides. The fencing for 3 sides of the pen costs \$20 per linear foot. The fourth side of the pen requires a gates and the cost is \$30 per linear foot on that side. Find the dimensions that will minimize the cost.