Lab Objectives: To identify characteristics of linear and quadratic functions. To maximize a quadratic function. To apply this knowledge to a practical situation, and alter methods of solution when a new situation arises.

Description of Lab:
Part A: Your class wants to help with the design of a rectangular playground. It will be placed in the corner of the building, with two sides enclosed by the exterior school wall, and the other two sides fenced. The school has a budget that will allow for $1200 worth of fencing, and you want to maximize the playgrounds' area. Design two models for two fence types – a 5 foot high stucco fence which costs $20 per linear foot installed, and a 4 foot high chain link fence which costs $12 per linear foot installed. Design the playground based on the information given and provide design specifications along with your justification.

Part B: Uh-oh. Your principal now tells you that the state has a code for playgrounds. Apparently the total area of the playground cannot exceed 25 square feet per child playing at one time. Your principal assures you there will be no more than 30 children on the playground at any one time. How does this affect the model you chose originally? Rewrite your conclusions based on your analysis.

Requirements (be sure to include a minimum of the following):
1. Cover page with: title of lab, date and names of each group member
2. Part A (complete 2 through 6 for stucco and chain link fence types independently):
   2. Determine how many linear feet of fencing your budget allows
   3. Write an equation for area
   4. Graph the equation given in part 3A (not a picture of the playground)
   5. Find the roots and maximum of the graph
   6. What are the dimensions that yield the maximum area?
   7. Describe in detail to the principal a justification for your choice of fencing, along with a diagram of the proposed playground
   8. How much more area (as a percentage) do you get by going with the chain link fencing as opposed to the stucco?

Part B
9. Find the maximum area allowed by the state
10. Using the model chosen in part (7), redraw your graph in part 3A, and shade in the region that is allowable by the state
11. What are the dimensions of a playground if you use all the fencing you can afford?
12. Is this practical? What would you suggest to the principal now?