

### Homework Day 3 (Due 4/7)

5. I need to fence in a new rectangular portion of my yard for my dog Mystic. I have purchased 60 feet of fencing and I plan to use the house as one side of the pen.
  - a. Which configuration will give Mystic the most room? Support your conclusion with a carefully constructed area function, a graph of the function with everything clearly labeled, with the maximum area clearly marked on the graph and with a final sketch of Mystic's new pen with the area and fence dimensions of the pen clearly labeled.
  - b. Suppose I wish to make sure Mystic has exactly 450 square feet of room, if I use the same construction ideas (60 feet of fence, one side on the house), algebraically determine (use the quadratic formula) the dimensions of the 450 square feet pen. Show your work for determining the solution; mark the point(s) on the graph in part a) and sketch the 450 square foot pen(s) with the fence dimensions of the pen(s) clearly labeled.
  - c. What is the domain of your area function? (include units of feet)
  - d. What is the range of your area function? (include units of square feet)
  
6. I looked on the Internet and decided Mystic really only needs about 125 square feet of space in the yard. Additionally, for better ventilation, all sides should be wire fencing (so I cannot use the side of the house). I plan to purchase new wire fencing at a cost of \$3 / foot for three sides of the pen and my neighbor will sell me some old fencing for \$2 / foot for the back and less visible side of the pen.
  - a. Which rectangular configuration will cost the least to build? Support your conclusion with a carefully constructed cost function, a graph of the function with everything clearly labeled, with the least cost of the pen clearly marked on the graph and with a final sketch of the pen with the cost and the fence dimensions of the pen clearly labeled.
  - b. Suppose I wish to spend exactly \$125, if I use the same construction ideas (exactly 125 square feet of pen area, three sides new fencing, one side old fencing), algebraically determine (use the quadratic formula) the dimensions of the \$125 chicken pen. Show your work for determining the solution; mark the point(s) on the graph in part a) and sketch the \$125 chicken pen(s) with the fence dimensions of the pen(s) clearly labeled.
  - c. What is the domain of your cost function? (Include units of feet). Hint: What makes sense here?
  - d. What is the range of your cost function? (Include units of \$).