Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

1. I'd like a garden with a fence around it. Three sides can be fenced using inexpensive wire that costs $2 per foot, and the fourth side needs more expensive fencing that costs $4 per foot. If my budget for the project is $80, what is the largest area garden I could build?

2. A rectangular garden of area 75 square feet is to be surrounded on three sides by a brick wall costing $10 per foot and one one side by a fence costing $5 per foot. Find the dimensions of the garden that will minimize the cost of the material.

3. Suppose you are a promoter for a (small-ish) local concert. Your job is to get enough income from ticket sales to turn a profit on the show after all costs are factored in. Let x be the number of attendees, and p the price of a ticket.

   (a) You know a ticket price of p = $30 will bring in about x = 500 people. If p = $35 then x = 460 people. Assuming the demand function is linear, find the revenue function.

   (b) Now you must factor in costs. The venue costs $7000 to rent, and promotion costs average out to approximately $4 per attendee. Find the cost function.

   (c) Recall that the profit $P = R - C$. Find the ticket price that maximizes the profit. Is there enough revenue to make a profit, or is the concert a total loss?

4. The demand equation for a company is $p = 200 - 3x$ and the cost function is $C(x) = 75 + 80x - x^2$ for $0 \le x \le 40$

   (a) Determine the revenue function.

   (b) Determine the profit function.

   (c) Determine the value of x and the corresponding price that will maximize the profit.