

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

1. (*0 points*) 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. (*0 points*) 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. (*0 points*) The Great American Tire Company expects to sell 600,000 tires during the next year. Each supply run costs the company \$15,000. Carry costs (based on the average number of tires in storage), are \$5 per tire.

- Let r be the number of orders during the year and x be the order quantity. Determine the equation for inventory cost. (Recall: inventory cost = carrying cost + ordering cost).
- Determine the inventory cost for doing 10 supply runs during the year.
- Find the order quantity that will minimize the inventory cost.

4. (*0 points*) 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.

- 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.
- 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.
- 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?

5. (*0 points*) The demand equation for a company is $p = 200 - 3x$ and the cost function is $C(x) = 75 + 80x - x^2$ for $0 \leq x \leq 40$

- Determine the revenue function.
- Determine the profit function.
- Determine the value of x and the corresponding price that will maximize the profit.
- If the government imposes a tax of \$4 per unit produced, determine the new price that maximizes the profit.