5 pts. Each
Decimals OK

Name: _____

Math 180 - Homework #6

Write the ANSWERS ONLY on this page. Do your calculations/work elsewhere, then NEATLY transfer your answers to this page.

	ANSWER
1. The price of a watch is given by: **$p = 40 - (0.01)x$**. The cost of manufacturing those watches is: **$C(x) = 2000 + 15x + (0.02)\,x^2$**. How many watches should the company make to maximize its profit? What will that maximum profit be? What price should the company charge for each watch? (Note: This problem will have decimals for the answers. Just round to the nearest watch and the nearest penny for profit and price.)	# Watches: Profit: $ Price/watch: $
2. A calculator company calculates the price it should charge for its calculators is: **$p(x) = 60 - (0.002)x$**. It further calculates the cost of manufacturing those calculators is: **$C(x) = (0.003)x^2 + 30x + 25{,}000$**. Calculate the calculator company's maximum profit, the ideal number of calculators to sell and the best price to charge for each calculator.	# Calculators: Profit: $ Price/calculator: $
3. A liquid form of penicillin manufactured by a pharmaceutical firm is sold in bulk at a **price of $200 per unit**. If the total production cost (in dollars) for x units is: **$C(x) = 500{,}000 + 80x + 0.003x^2$**, and if the production capacity of the firm is at most 30,000 units in a specified time, how many units of penicillin must be manufactured and sold in that time to maximize the profit?	# Units Penicillin:
4. A rectangular plot of land is to be fenced in using two kinds of fencing. Two opposite sides will use heavy-duty fencing selling for **$3 a foot**, while the remaining two sides will use standard fencing selling for **$2 a foot**. What are the dimensions of the rectangular plot of greatest area that can be fenced in at a **cost of $6000**?	Dimensions of Plot: **by**
5. A chemical manufacturer sells sulfuric acid in bulk at a **price of $100 per unit**. If the daily total production cost in dollars for x units is: **$C(x) = 100{,}000 + 50x + 0.0025x^2$**, and if the daily production capacity is **at most** 7000 units, how many units of sulfuric acid must be manufactured and sold daily to maximize the profit?	# Units Sulfuric Acid:
6. A firm determines that x units of its product can be sold daily at p dollars per unit where **$x = 1000 - p$**. The cost of producing x units per day is **$C(x) = 3000 + 20x$**. (Hint: FIRST solve $x = 1000 - p$, for p in terms of x) (a) Find the revenue function, R(x). (b) Find the profit function, $\mathbb{P}(x)$ (c) Assuming that the production capacity is at most 500 units per day, determine how many units the company must produce and sell each day to maximize the profit. (d) Find the maximum profit. (e) What price per unit must be charged to obtain the maximum profit?	(a) R(x) = (b) $\mathbb{P}(x)$ = (c) # Units: (d) Profit: $ (e) Price/unit: $
7. Suppose that the demand equation for a monopolist is **$p = 150 - .02x$** and the cost function is **$C(x) = 10x + 300$**. Find the value of x that maximizes the profit.	# Units:
8. The demand equation for a certain product is **$p = 6 - \frac{1}{2}\,x$** dollars. Find the level of production that results in maximum revenue.	# Units:

Write the ANSWERS ONLY on this page. Do your calculations/work elsewhere, then NEATLY transfer your answers to this page.

ANSWER

9. Suppose that the demand equation for a monopolist is **p = 100 - .01x** and the cost function is **C(x) = 50x + 10,000**. Find the value of x that maximizes the profit and determine the corresponding price and total profit for this level of production.

Units:

Profit: $

Price/unit: $

10. The price of selling knee-wrecking snowboards is $p = -\frac{1}{3}x + 4$. Calculate the maximum revenue from selling these knee-breakers.

Revenue: $

11. Suppose a rival snowboard company has a better way to destroy your knees and sells it for a revenue of $\mathbf{R(x) = 0.4x^2 + 10x + 5}$ at a manufacturing cost of $\mathbf{C(x) = 0.5x^2 + 2x + 101}$. Find the maximum profit.

Profit: $

12. Suppose that the revenue generated by selling x grams of crack is given by $R(x) = -\frac{1}{5}x^2 + 200x$. Assume that R is in Euros. What is the maximum revenue possible in this situation?

Revenue: €

13. Ying Bai is the manager of a tire repair shop. She found that by charging **p = -0.25x + 40** to fix a tire will maximize her revenue. What is this maximum revenue, how many tires need to be repaired to achieve this revenue and at what price per tire?

Tires:

Revenue: $

Price/tire: $

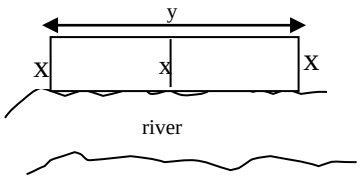
14. A snowmobile manufacturer is planning a new line of ski-doos. The price is dependent on the number of ski-doos sold (x), and is given as $p(x) = 3432 - 11x$. What is the maximum revenue that the manufacturer can expect, using this model for revenue? What will be the price for one ski-doo?

Ski-Doos:

Revenue: $

Price/Ski-Doo: $

15. A farmer wants to enclose two adjacent rectangular regions, as shown below, next to a river, one for sheep and one for cattle. No fencing will be needed on the river side, but **210 m of fencing** is available. What is the area of the largest region that can be enclosed?



Total Area:

$\mathbf{m^2}$