MATH 119 **TEST 3B Key** ***(Chapter 4)*** NAME:

Class ID #:

1) An appliance firm determines to sell x radios, the price per radio is given by $p = 280 - 0.4x$ it also determines that the total cost of producing x radios is given by: $C(x) = 5000 + 0.6\,x^2$. How many radios must be produced and sell to maximize the profit? What price per radio must be charge to maximize the profit?

$R = 280x - 0.4x^2$

$P = R - C = -x^2 + 280x - 5000$

$P' = 0$, then $x = 140$

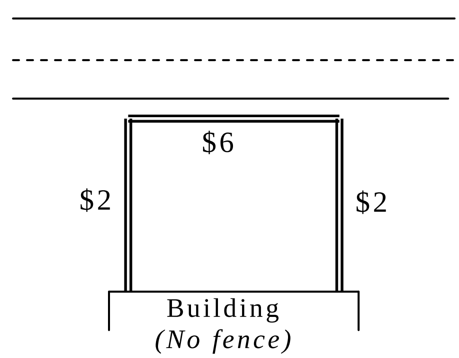
Price per unit = \$224

2) A company estimate that it can sell 1000 units per week if it sets the unit price at \$5, but that its weekly sales will rise by 100 units for each \$0.20 decrease in price. Find the production level (*price per unit and number of units*) that maximize the revenue

1750 units, \$3.5 per unit

3) A rectangular lot to be fenced off along the highway, the fence along the highway costs \$6 per ft, and on the two sides is \$2 per foot and no fence next to the building. Using \$444, find the dimensions for the maximum area.

37 by 55.5

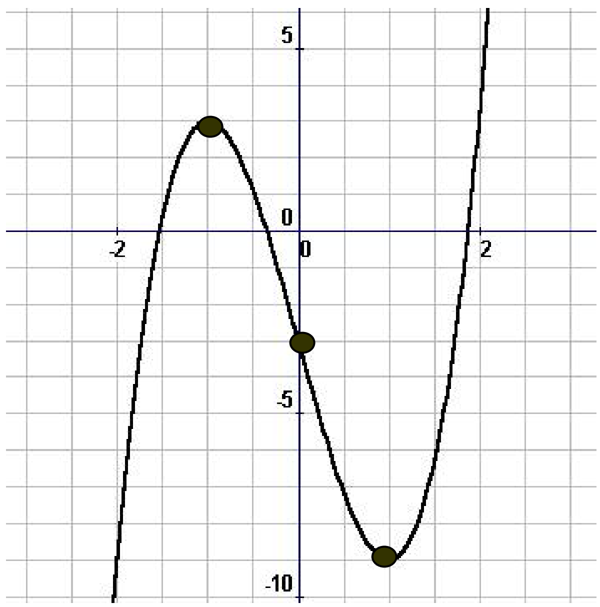


4) Use the first derivative to find all critical points and use the second derivative to find all inflection points. Show your work, show the max and min value, the interval where the function is increasing or decreasing, concave or concave down.

$f(x) = 3x^3 - 9x - 3$ and Sketch the graph

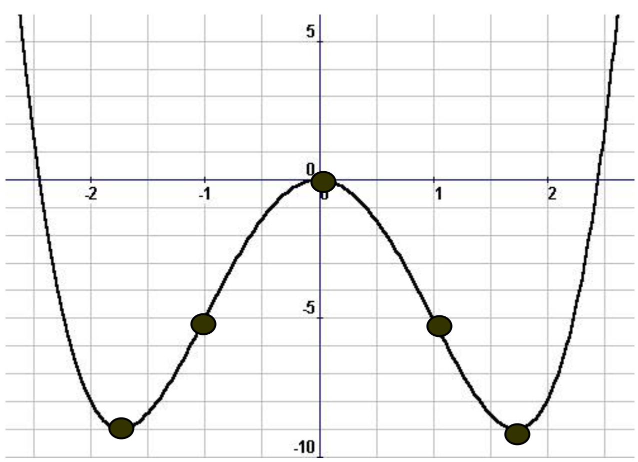
Increasing in:	**$x < -1$, $x > 1$**
Decreasing in:	**$-1 < x < 1$**
Local Max. and Max values:	**at x =1 , Max (-1 , 3)**
Local Min. and Min values:	**at x = 1 , Min (1 , -9)**

Inflection points at:	**(0, -3)**
Concave Up in:	**$x > 0$**
Concave Down in:	**$x < 0$**



5) Use the first derivative to find all critical points and use the second derivative to find all inflection points. Show your work, show the max and min value, the interval where the function is increasing or decreasing, concave or concave down.

$f(x) = x^4 - 6x^2$ and Sketch the graph



Increasing in:	**$-1.73 < x < 0$, $x >$ 1.73**
Decreasing in:	**$x < -1.73$, $0 < x <$ 1.73**
Local Max. and Max values:	**x = 0 , Max (0 , 0)**
Local Min. and Min values:	**Min at (-1.73, -9) and (1.73 , -9)**

Inflection points at:	**(-1 , -5) and (1 , -5)**
Concave Up in:	**$x < -1$, $x > 1$**
Concave Down in:	**$-1 < x < 1$**