MATH 119 TEST 3A Key ***(Chapter 4)*** NAME:
Class ID #:

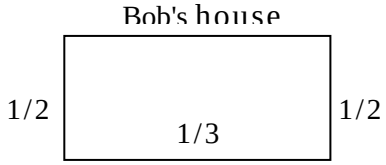
1) An appliance firm determines to sell q unit, the price per unit is given by $p = 400 - q$ it also determines that the total cost of producing q radios is given by: $C(q) = 1000 + q^2$. How many units must be produced and sell to maximize the profit

100 units

2) An apartment complex can fill 100 units when the rent is $400 per month. It is estimated that for each $10 per month decrease in rent, 5 more units will become occupied. The complex has a monthly maintenance cost of $100 for each unit rented. What monthly rent should be charged to maximize the profit?

$ 350

3) A rectangular play area to be fenced off beside Bob's house. Bob agreed to pay the cost of the side beside his house, also he agreed to pay 1/2 of the cost for two sides and 1/3 of the cost for the other side that he shares with his neighbors. if he has $240, what are the dimensions for the largest area?

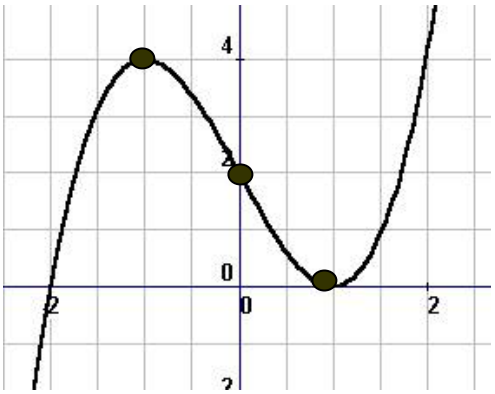


90 by 120

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 up or down and sketch the graph.

$f(x) = x^3 - 3x + 2$ and Sketch the graph

Show your work here:



Increasing in:	***x < -1 , x > 1***
Decreasing in:	***-1 < x < 1***
Local Max. and Max values:	***x = -1, Max (-1 , 4)***
Local Min. and Min values:	***x = 1 , Min (1 , 0)***

Inflection points at:	***at x = 0 or (0 , 2)***
Concave Up in:	***x > 0***
Concave Down in:	***x < 0***

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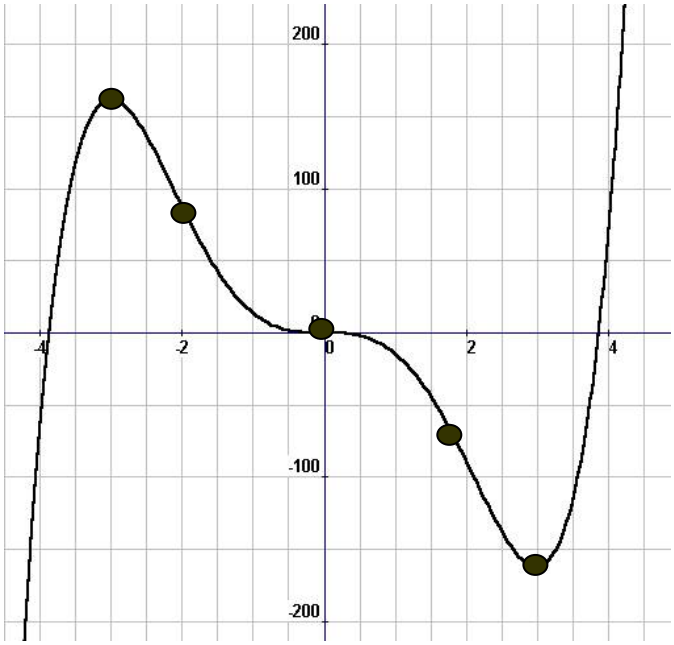
5) Use the first derivative to find all critical points and use the second derivative to find all inflection points. Show your work, show the max and min value, the interval where the function is increasing or decreasing, concave up or down and sketch the graph.

$f(x) = x^5 - 15x^3$ and Sketch the graph

Show your work here:



Increasing in:	**$x < -3$, $x > 3$**
Decreasing in:	**$-3 < x < 3$**
Local Max. and Max values:	**Max (-3, 162)**
Local Min. and Min values:	**Min (3 , -162)**

Inflection points at:	**(-2.12, 100.2) , (0,0) , (2.12, -100.2)**
Concave Up in:	**$-2.1 < x < 0$, $x > 2.1$**
Concave Down in:	**$x < -2.1$, $0 < x < 2.1$**