Prince Sultan University
MATH 211
Final Exam
First Semester 2007/2008, Term 081
Thursday, February 5 2009
Dr. Aiman Mukheimer

Time Allowed: <u>100 minutes</u>

Name: _____ _____ _____
(First) (Middle) (Last)

ID Number: _____

<u>Important Instructions:</u>

- You may use CASIO scientific calculator that does not have programming or graphing capabilities.
- You may **NOT borrow** a calculator from anyone.
- There should be **NO talking** during the examination.
- Your exam will be taken **immediately** without any warning if your mobile is seen or heard
- You must show all your work beside the problem. Be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
- This examination has **10** problems, some with several parts. Make sure that your paper has all these problems

Problems	Max points	Student's Points
1,2,3	17	
4,5	14	
6	12	
7	20	
8,9,10	17	
Total	80	

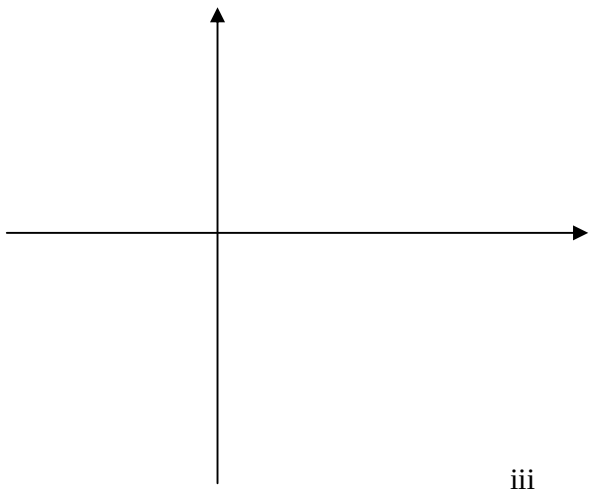
Q1. (6 points) How long will it take for an amount of $6195 reach $10000, with an interest rate 6% compounded monthly.

Q2. (6 points) It is estimated that t months from now the population of a certain town will be changing at the rate of $4+5t^{\frac{2}{3}}$ people per month. If the current population is 10,000, what will be the population 8 months from now?

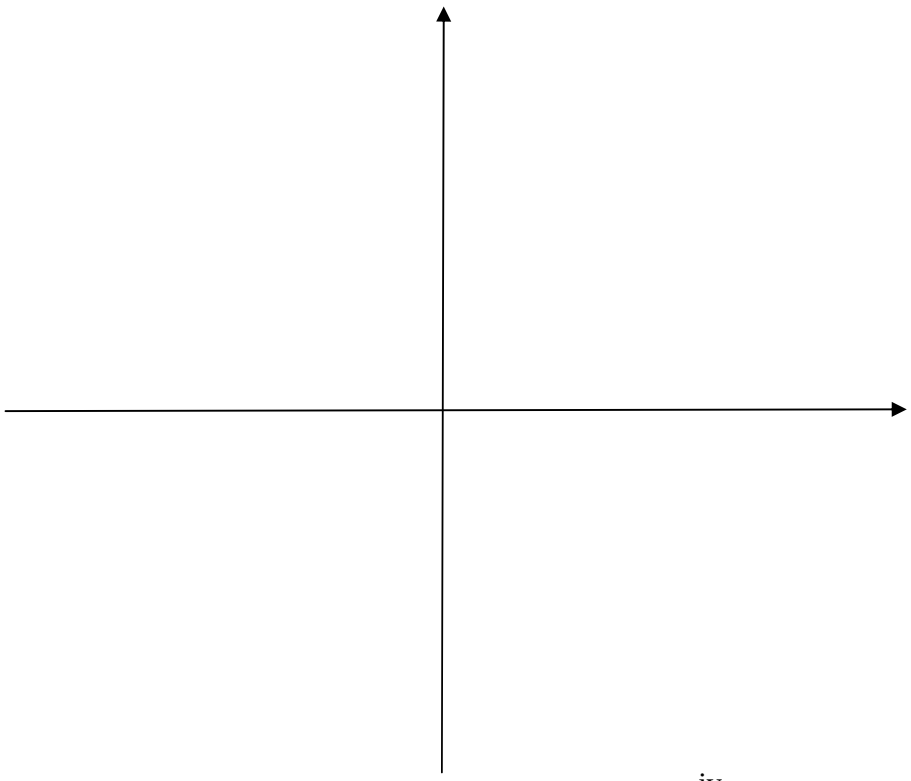
Q3. (5 points) The total cost of producing x units of a certain commodity is $C(x)=x^2-5x+8$. Determine the minimum cost of the commodity.

Q4. (7 points) Find the critical points of $f(x) = \frac{x^2}{x-2}$ and use the second derivative test to classify each critical point as a relative maximum or minimum.

Q5. (7 points) **Sketch** the region R <u>and</u> then **find** the area bounded by the $x-$axis and the curve: $y = -x^2 + 4x - 3$



Q6. (12 points) Use calculus to sketch the graph of the function $f(x) = 3x^5 - 20x^3$



Q7. (20 points) Evaluate the following integrals:

1. $\int \frac{(\sqrt{x}-1)^{\frac{3}{2}}}{\sqrt{x}} dx$

2. $\int_0^6 x^2(x-1)\,dx$

3. $\int_{-1}^4 \frac{x}{\sqrt{x+5}} dx$

4. $\int \frac{x^3}{\sqrt{x^2+1}} dx$

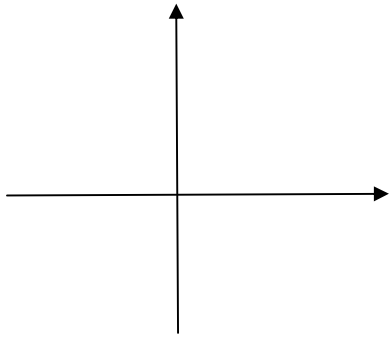
Q8. (5 points) Evaluate the partial derivative $f_x(1,1)$ for the function

$$f(x,y) = xy\ln\left(\frac{y}{x}\right) + \ln\left(2x - 3y\right)^2$$

Q9. (6 points) Records indicate that t months after the beginning of the year, the price of ground beef in local supermarkets was $P(t) = 0.09t^2 - 0.2t + 1.6$ dollars per pound. What was the average price of ground beef during the first 3 months of the year?

Q10. (6 points) Describe **and** sketch the <u>domain</u> for the following functions:

1. $f(x, y) = \dfrac{4x - 8e^y}{(-x^2 - y^2 + 9)^{1/2}}$



2. $f(x, y) = \ln(4 - y)$