

Name: _____ PID: _____

TA: _____ Sec. No: _____ Sec. Time: _____

Math 10C

Midterm Exam 1 Oct 22, 2008

Turn off and put away your cell phone.

No calculators or any other devices are allowed on this exam.

You may use one page of notes, but no books or other assistance on this exam.

Read each question carefully, answer each question completely, and show all of your work.

Write your solutions clearly and legibly; no credit will be given for illegible solutions.

If any question is not clear, ask for clarification.

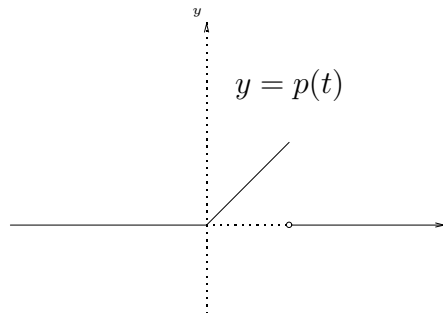
The last page is blank for extra workspace.

Should your answer for any problem exceed the space provided, please write “see last page” and continue your work on the last page.

#	Points	Score
1	8	
2	6	
3	4	
4	10	
5	6	
Σ	34	

1. (8 pts) The probability density function of the time (in years) to failure of an electrical device is given by:

$$p(t) = \begin{cases} 0 & \text{if } t < 0, \\ 2t/c & \text{if } 0 \leq t \leq \sqrt{c}, \\ 0 & \text{if } x > \sqrt{c}. \end{cases}$$



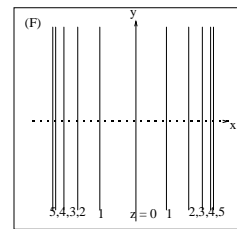
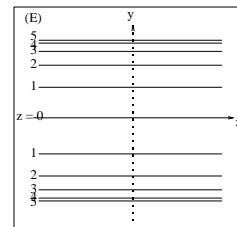
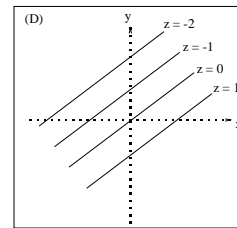
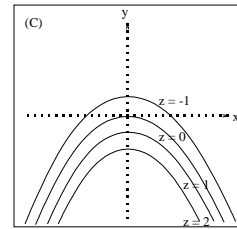
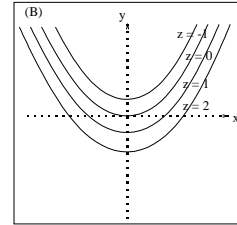
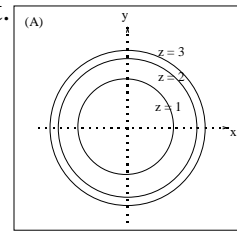
- (a) What is the probability that the device will work for at least 1 year? (The answer will depend on c .)

- (b) If the median is 2 years, what is c ?

2. (6 pts) Find the third degree Taylor polynomial approximating $f(x) = x \ln x$ near $x = 1$.

3. (4 pts) Find the vector of length 3 that points in the exact opposite direction of the vector $2\vec{i} - 3\vec{j} + \vec{k}$.

4. (10pts) Match each function on the left with its contour diagram on the right.



(i) $f(x, y) = 3x - 5y$ _____

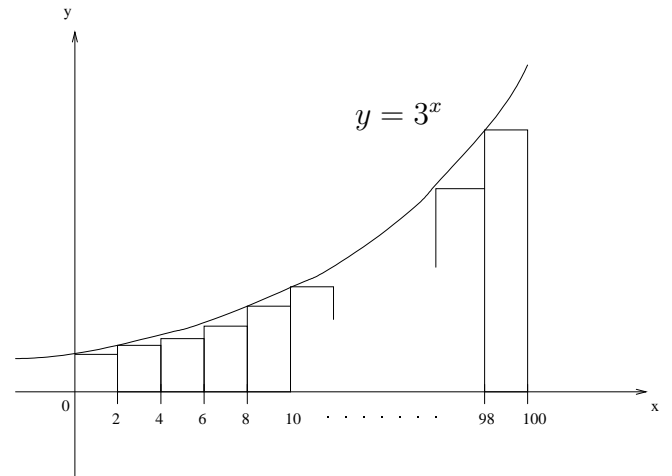
(ii) $f(x, y) = -x^2 - y$ _____

(iii) $f(x, y) = x^2$ _____

(iv) $f(x, y) = x^2 + y^2$ _____

(v) $f(x, y) = x^2 - y$ _____

5. (6 pts) Compute the left Riemann sum approximation of the definite integral: $\int_0^{100} 3^x dx$, with respect to the partition of 50 equal subintervals. (*Hint:* This Riemann sum is a geometric series.)



Extra space