MATH 132 – Sections 2 and 3
Calculus for Physical and Life Sciences
Information about the Final Exam
April 29, 2008

Final Exam Schedule

Section 2 (10:00 class) - Wednesday, May 7th from 2:30-5:30pm in Swords 328

Section 3 (12:00 class) - Thursday, May 8th from 8:30-11:30am in Beaven 118

Office Hours

Below is a list of my office hours during study period and the week of final exams.

Wednesday, April 30th – 2:00-3:30pm

Thursday, May 1st – 1:00-2:00pm

Tuesday, May 6th – 1:00-2:00pm

Wednesday, May 7th – 1:00-2:00pm

General Information

- The format of the final exam will be similar to that of the midterm exams but it will be about 1.75 times as long. If you have kept up with the material all semester you should be able to finish the final exam in 2 hours. However, I will give you the full three hour exam period to complete the exam.
- You will be given a TI-30 scientific calculator for the exam which does NOT have graphing capabilities so be prepared to answer questions without your personal calculator. (Note: Some of you may have one of these calculators purchased for use in Chemistry courses here. That is also OK.)
- Use of cell phones, iPods, and all other electronic devices *is not allowed* during the exam. Please leave such devices in your room or put them away in your backpack (make sure cell phones are *turned off*).

- Please review the policy on academic honesty. This policy will be strictly enforced.

What will be covered

The exam will cover the material since the start of the semester. You can look at the review sheet for each midterm exam for a summary of the material covered on that exam. I have posted these along with the solutions to the three midterm exams in the announcement section of the main course web page. For the material on probability, you need to know all of the concepts used in the last homework assignment. These are listed below.

1. Verify that a given function on an interval is a probability density function using the definition.
2. Set up integrals that represent probabilities and compute them.
3. Know and use the definition to compute the expected value(or mean), variance, standard deviation and median of a continuous random variable for a given probability density function.
4. Work with normal probability density functions and sketch their graphs.
5. Know the definition of a cumulative distribution function and sketch its graph for a given probability density function.

Sample Exam Questions on Probability

1. The average waiting time in minutes for patients arriving at a health clinic between 1:00pm and 4:00pm on a weekday is an exponentially distributed random variable x with the associated probability density function $f(x) = \frac{1}{15}e^{-\frac{1}{15}x}$.
   (a) What is the probability that a patient arriving at the clinic between 1:00pm and 4:00pm will have to wait longer than 15 minutes?
   (b) What is the probability that a patient arriving at the clinic between 1:00pm and 4:00pm will have to wait between 10 and 12 minutes?
   (c) What is the expected waiting time of a patient chosen at random?
2. Find the median for the probability density function $f(x) = \frac{1}{6\sqrt{x}}$ on $[1, 16]$.

3. The amount of snowfall (in feet) in a remote region of Alaska in the month of January is a continuous random variable with probability density function

$$f(x) = \frac{2}{9}x(3 - x)$$

for $0 \leq x \leq 3$.

   (a) Verify that $f(x)$ is a probability density function on the domain $[0, 3]$.

   (b) Find the probability that the amount of snowfall will be between 1 and 2 feet?

   (c) Find the probability that the amount of snowfall will be more than 1 foot?

   (d) Find the amount of snowfall one can expect in any given month of January in this region of Alaska.

   (e) Find the variance and standard deviation for the random variable x associated with the density function $f(x)$.

4. The medical records of infants delivered at Kaiser Memorial Hospital show that the infants' lengths at birth (in inches) are normally distributed with a mean of 20 and a standard deviation of 2.6.

   (a) Find the probability that an infant selected at birth is between 19 and 21 inches. Set up the appropriate integral and approximate it using Simpson's rule with $n = 4$.

   (b) Sketch a qualitative graph of the normal density function and label the maximum value and the points of inflection for the graph.

   (c) Find the median length of an infant born at Kaiser Memorial Hospital. (Hint: You don't need to do an integral here. Think in terms of areas.)