Math 126 Exam 1 Practice Problems

Before taking the exam, you should be able to comfortably complete and understand all the problems from the old exams archive since winter 2006, all the problems in the homework, and all examples from lecture. Remember that you get one 8.5 x 11 inch sheet of handwritten notes for the exam. START STUDYING!

The following problems have all appeared on old exams for Math 126. These problems alone are not sufficient to prepare you for the exam. However, they give you a good start.

Today, you will work through these problems as if you were in an exam situation. After 10-15 minutes of working on your own, you will get in small groups to discuss your solutions. If your group is completely stuck, ask your TA. Your TA will present complete solutions for one or two of the problems towards the end of class.

1. (FROM FALL 2006 ARMS) Let $g(x) = \dfrac{1}{5-x} + \dfrac{x}{1+4x^2}$.

   (a) Find the Taylor Series for $g(x)$ based at $b = 0$.

   (b) Give the open interval of convergence.

2. (FROM SPRING 2006 CONROY) Give the coefficient of x^{11} in the Taylor series for $f(x) = x^3 e^{x^2}$ based at $b = 0$.

3. (FROM WINTER 2006 CONROY) Approximate the integral

$$\int_0^2 \sin(t^2)\ dt$$

by using the first four non-zero terms of a Taylor series. Give a decimal approximation of your result.

4. (FROM FALL 2006 PEVTSOVA) Let $f(x) = 2\cos^2(x) - 1$.

   (a) Find the quadratic approximation $T_2(x)$ of $f(x)$ based at $b = 0$.

   (b) Use the quadratic approximation to estimate $f(\frac{\pi}{8})$.

   (c) Using Taylor's inequality, find the error bound for the estimate you computed in (b). (Hint: Use the interval $I = [-\frac{\pi}{8}, \frac{\pi}{8}]$.)

The following problem is about vectors. You should already be able to do part (a). Parts (b) and (c) will be discussed in lecture on Friday and Monday. You are expected to know this material by exam time.

5. (FROM SPRING 2006 BOGART) Let $\vec{u} =< 1, 3, 5 >$ and $\vec{v} =< -2, 0, 4 >$.

   (a) Compute $2\vec{u} - 3\vec{v}$.

   (b) Compute $\vec{u} \cdot \vec{v}$.

   (c) Compute $\vec{u} \times \vec{v}$.