Math 217 – MIDTERM EXAM 1 – Spring 2005

YOUR NAME: ______________________________

Circle your TA's name and the meeting time of your Discussion Session:

Seth Case	11:00am	2:25pm
Stephen Hruzka	12:05pm	3:30pm
James Hunter	7:45am	8:50am
Gabriel Pretel	9:55am	1:20pm
Patrick Rault	12:25pm	

Show all your work. Answers without showing all work receive zero points.

1. *(20 points)* Compute the following antiderivatives:

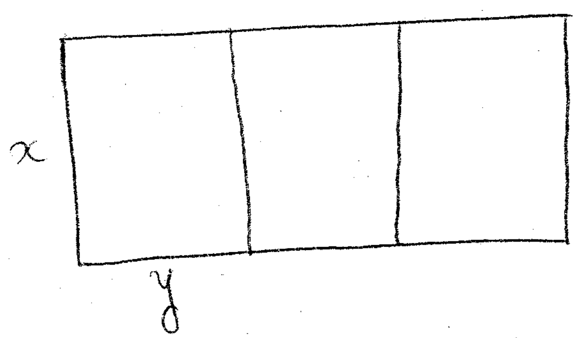
(a) $\int (x^2 + \pi) dx$

(b) $\int (\sqrt{2}x + 1)^3 \sqrt{2} dx$

(c) $\int \frac{3y}{\sqrt{2y^2+5}} dy$

2. *(15 points)* Suppose that in a race horse A and horse B begin at the same point and finish in a dead heat. Prove that their speeds were identical at some instant of the race.

3. *(15 points)* A farmer wishes to fence off three identical adjoining rectangular pens, each with 600 square feet of area, as shown in the figure below. What are x and y so that the least amount of fence is required?



4. *(20 points)* Consider the function $g(x) = 2x^3 - 3x^2 - 12x + 3$. Determine where the graph of this function is increasing, decreasing, concave up, and concave down; determine the local minimum points, the local maximum points and the inflection points; then, sketch the graph.

5. *(15 points)*

(a)(5 points) What is the derivative of the function $G(x) = \int_0^x (2t^2 + \sqrt{t})$?

(b)(10 points) Use the Σ notation to write a formula for a quantity A_n such that $\lim_{n \to \infty} A_n$ is the area under the graph of $f(x) = 2x^2 + 2$ on the interval $[-1, 1]$.

6. *(15 points)* Find the general solution of the differential equation $\dfrac{dz}{dt} = t^2 z^2$. Then, find the particular solution that satisfies $z = 1/3$ at $t = 1$.