Math 132
Midterm Examination 1 – February 8, 2012

6 multiple choice, 4 long answer. 100 points.

General Instructions: Please answer the following, without use of calculators. You may refer to a 3x5 card, but no other notes. Part I of the exam is multiple choice, while Part II is long answer.

Part I Instructions: If you do not have a pencil to fill out your answer card, please ask to borrow one from your proctor. Write your Student ID number on the six blank lines on the top of your answer card, and shade in the corresponding bubbles to the right of each digit.
Fill in the bubble corresponding to each of the following 6 questions. Each is worth 4 points. On Part I, no partial credit will be given.

1. Let $x_i = \dfrac{3i}{2n} - 1$ for $i = 0, 1, \ldots, n$. These x_i's form a partition of the interval:

   (a) $[-1, 0]$
   (b) $[-1, \frac{1}{2}]$
   (c) $[-1, 2]$
   (d) $[0, \frac{1}{2}]$
   (e) $[0, 1]$
   (f) $[0, 2]$
   (g) $[0, 3]$
   (h) $[1, \frac{3}{2}]$
   (i) $[1, 3]$
   (j) $[1, \frac{5}{2}]$
   (k) None of the above.

2. Which of the following is equal to

$$\sum_{i=1}^{19} \frac{1}{i}$$

(a) $0+1+\frac{1}{2}+\frac{1}{3}+\cdots+\frac{1}{19}$.

(b) $0+1+\frac{1}{2}+\frac{1}{3}+\cdots+\frac{1}{20}$.

(c) $1+\frac{1}{2}+\frac{1}{3}+\cdots+\frac{1}{19}$.

(d) $1+\frac{1}{2}+\frac{1}{3}+\cdots+\frac{1}{20}$.

(e) $\int_1^{19} \frac{1}{x}\,dx$.

(f) $\int_0^{19} \frac{1}{x}\,dx$.

(g) $\int_0^{20} \frac{1}{x}\,dx$.

(h) $\int_1^{20} \frac{1}{x}\,dx$.

(i) None of the above.

3. Which of the following is an antiderivative of $\frac{1}{1+4x^2}$?

(a) $\frac{1}{4}\tan^{-1}(x)$

(b) $\frac{1}{2}\tan^{-1}(x)$

(c) $\tan^{-1}(2x)$

(d) $\frac{1}{2}\tan^{-1}(2x)$

(e) $\ln(1+4x^2)$

(f) $\frac{1}{4}\ln(1+4x^2)$

(g) $\frac{1}{2x}\ln(1+4x^2)$

(h) $1+\ln(4x^2)$

(i) None of the above.

4. $\dfrac{d}{dx}\displaystyle\int_{-\pi}^{x} \sin t^2\, dx$ is equal to

   (a) $\sin x^2$

   (b) $\cos x^2$

   (c) $2x \cdot \sin x^2$

   (d) $2x \cdot \cos x^2$

   (e) 0

   (f) $\cos x^2 + C$

   (g) $\dfrac{1}{2}x \cdot \cos x^2$

   (h) $\dfrac{1}{2}x \cdot \cos x^2 + C$

   (i) None of the above.

5. If f is a continuous function such that $\int_0^{12} f(t)\, dt = 3$, $\int_2^{12} f(t)\, dt = 4$, and $\int_2^4 f(t)\, dt = 1$, then find $\int_0^4 f(t)\, dt$.

   (a) -4

   (b) -3

   (c) -2

   (d) -1

   (e) 0

   (f) 1

   (g) 2

   (h) 3

   (i) 4

   (j) None of the above.