Serial No.:_____ Student Name:_____ Student Number: _____

Instructor: M. Z. Abu-Sbeih Math 102- Q1 Date: 14-3-2009

**Problem 1: (5 points)** Estimate the area under the graph of $f(x) = x^3$ from $x = 0$ to $x = 4$ using **four** approximating rectangles and taking the sample point to be the **left endpoint**.

**Problem 2: (4 points)** Write the limit as a definite integral on $[0, 3\pi]$:

$$\lim_{n\to\infty} \sum_{i=1}^{n} \frac{9\pi^2 i}{n^2} \sin\left(1 + \frac{3\pi i}{n}\right)$$

**Problem 3: (4 points)** Evaluate $\int \frac{1-\sin x}{\cos^2 x}\, dx$

**Problem 4: (4 points)** If $f(x) = \int_{\sqrt{x}}^{1-x} t^3 e^t\, dt$ find $f'(4)$.

**Problem 5: (8 points)** Consider the are under the curve $f(x) = x^2$ from $x = 2$ to $x = 3$.

a. Write the area as a limit of the Riemann sum.

b. Write the area as a definite integral and **find it**.

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**Problem 1: (5 points)** Estimate the area under the graph of $f(x) = x^3$ from $x = 0$ to $x = 4$ using **four** approximating rectangles and taking the sample point to be the **right endpoint**.

**Problem 2: (4 points)** Write the limit as a definite integral on $[0, 2\pi]$:

$$\lim_{n\to\infty} \sum_{i=1}^{n} \frac{4\pi^2 i}{n^2} \sin\left(1 + \frac{2\pi i}{n}\right)$$

**Problem 3: (4 points)** Evaluate $\int \frac{1+\cos x}{\sin^2 x}\, dx$

**Problem 4: (4 points)** If $f(x) = \int_{1-x}^{\sqrt{x}} t^3 e^t \, dt$ find $f'(9)$.

**Problem 5: (8 points)** Consider the are under the curve $f(x) = x^2$ from $x = 1$ to $x = 2$.

a. Write the area as a limit of the Riemann sum.

b. Write the area as a definite integral and **find it**.