MA 126-E0 Summer 2006 Test 1

1. Evaluate $\int_0^1 (3x+1)e^{-x}dx$.
2. Evaluate
$$\int_3^4 \frac{x-9}{x^2+3x-10}dx.$$
3. Evaluate $\int_0^1 x^2(1+2x^3)^5 dx$.
4. Suppose we want to approximate $\int_2^{5/2} \sin(x^2)dx$.

(a) Find a value of n so that the midpoint approximation using n subdivisions of the interval will be within $1/100$ of the value of this integral.

(b) Write out the terms of the midpoint approximation for this value of n. (Do not attempt to evaluate this sum).

5. Find the area bounded by the graphs of $y = \sin(x)$ and $y = 1/2$ for $0 \le x \le \pi/2$.
6. Determine whether the following integral converges ot diverges:
$$\int_1^\infty \frac{1}{(3x+1)^2}dx.$$

If the integral converges, determine its value. If the integral diverges, it has no numerical value.

7. Let D be the region bounded by the graphs of $y = e^{2x}$, $x = -1$ and $x = 2$, and the $x-$ axis. Find the volume of the solid that results if D is rotated about the $x-$ axis.

Each problem is worth 16 points. In Problem 4, (a) is worth 10 points, and (b), 6 points.