Math 026L.04 Spring 2002
Assignment #6

This assignment is due Monday, March 18, 2002. You must work through all problems on your own. You may consult any reference materials, and seek help in the Help Room, but do not discuss these problems with anyone else in the class. Answers must be justified whenever possible in order to earn full credit.

1. Coursepack page 132
Calculator Practice (Do not hand in.)

2. Coursepack pages 132-133
Part I: Basic Computations Problems #1, #2

3. Let $f(x) = 16 - x^2$.

(a) Use a left hand Riemann sum with 8 subintervals to approximate the area below $f(x)$, above the x-axis, and between $x = -1$ and $x = 3$.

(b) Use a right hand Riemann sum with 8 subintervals to approximate the area below $f(x)$, above the x-axis, and between $x = -1$ and $x = 3$.

(c) Use a midpoint Riemann sum with 8 subintervals to approximate the area below $f(x)$, above the x-axis, and between $x = -1$ and $x = 3$.

(d) What can you say about your answers to **(a)**, **(b)**, **(c)** and the true area below $f(x)$, above the x-axis, and between $x = -1$ and $x = 3$.

4. Suppose that $g(x) = e^{-x^2}$.

(a) Write a definite integral to express the true area under the curve $g(x)$, above the x-axis, and between $x = 0$ and $x = 1$.

(b) Use a right hand Riemann sum with 100 subintervals to approximate the definite integral in **(a)**. *(Be sure to explicitly write the sum you are using to approximate this definite integral as well as what you entered on your calculator.)*

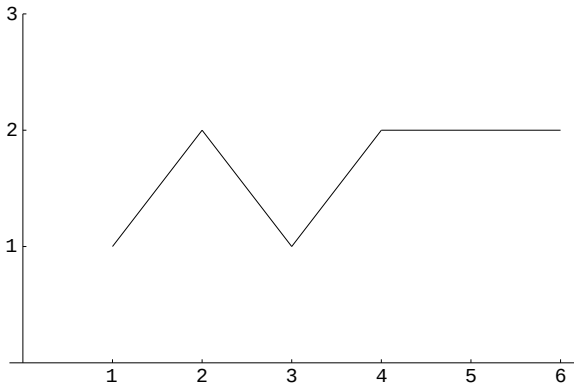
5. Suppose that $\int_a^b f(x)\,dx = 8$ and $\int_a^b g(t)\,dt = 2$. Evaluate the following definite integrals:

(a) $\int_a^b (f(y) + g(y))\,dy$

(b) $\int_a^b cf(z)\,dz$

6. Evaluate $\int_7^{13} \sin^2 x\,dx + \int_7^{13} \cos^2 x\,dx$. *(Hint: Use an identity.)*

7. Consider the graph of $f(x)$ shown below.



(a) What is $\int_1^6 f(x)\,dx$?

(b) What is $\int_6^1 f(x)\,dx$?

(c) What is the average value of $f(x)$ on $[1, 6]$?

8. Calculus Page 236 #30

9. Calculus Page 236 #32

10. Calculus Page 243 #22

11.

(a) Write the following series in Σ-notation: $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \cdots$

(b) It is known that if you approximate the value of this series using the first 950 terms, then the approximation is accurate to three decimal places. Use your calculator to find this approximation. *(Be sure to clearly write exactly what you entered on your calculator.)*

(c) What is $\tan^{-1} 1$ accurate to 3 decimal places? What does this say about the series from **(a)**?