Homework 5 - Math 142, Frank Thorne (thorne@math.sc.edu)

Due Wednesday, October 2

Important: Please show your work, write in complete sentences, draw pictures when appropriate, and explain your reasoning clearly.

- (a) Suppose f is continuous on $[a, \infty)$. What does $\int_a^{\infty} f(x) dx$ mean? What does it mean for it to converge or diverge?
- (b) Suppose f is continuous on $(-\infty, b]$. What does $\int_{-\infty}^{b} f(x) dx$ mean? What does it mean for it to converge or diverge?
- (c) Suppose f is continuous on $(-\infty, \infty)$. What does $\int_{-\infty}^{\infty} f(x) dx$ mean? What does it mean for it to converge or diverge?
- (d) Suppose f is continuous on [a, b], except for at x = c. Here assume that $c \in (a, b)$. What does $\int_a^b f(x) dx$ mean? What does it mean for it to converge or diverge?
- (e) Thomas, Chapter 8.8, 16-32 even, 66, 67. In 66, draw a picture and explain what happened.
- (f) What is an infinite sequence?
- (g) For each of the following: explain what it means for an infinite sequence to have the stated property, give an example that satisfies it, and give an example that does not satisfy it.
 - (i) to converge;
 - (ii) to diverge;
 - (iii) to diverge to ∞ ;
 - (iv) to diverge to $-\infty$;
 - (v) to be nondecreasing;
 - (vi) to be nonincreasing;
 - (vii) to be monotonic.
- (h) Thomas, Chapter 10.1, 14, 16, 28-36 even.