

**Math 10a**  
Practice Midterm 2 #2

1. In summation notation, write down the left Riemann sum estimate for  $\int_0^1 x(1-x)dx$  using 1000 intervals.
2. (a) What is the Taylor series for  $\ln(x)$  centered at  $x = 1$ ?  
(b) What is the radius of the convergence of the series from part (a)?  
(c) Write down a series of rational numbers converging to  $\ln(1/3)$ .
3. (a) Suppose giraffe neck lengths are normally distributed with mean of 6 feet and a standard deviation of 6 inches. What is the probability, given a randomly selected giraffe, that its neck is shorter than 5 feet?  
(b) Suppose giraffe tongue lengths are normally distributed with a mean of 20 inches (!) and a standard deviation of 3 inches. What is the probability that a randomly selected giraffe will have a tongue of length between 20 and 23 inches?

4. Compute the following integrals:

(a)

$$\int \frac{x}{1-x} dx$$

(b)

$$\int x\sqrt{x+1} dx$$

(c)

$$\int e^x \sin(x) dx$$

(d)

$$\int \sin(\sqrt{x}) dx$$

5. Compute the following integrals:

(a)

$$\int_1^2 \frac{x}{\sqrt{1+x^2}} dx$$

(b)

$$\int_0^\pi x \sin(x) dx$$

6. Recall that the uniform distribution from 0 to 1 is defined to be one whose pdf is

$$f(x) = \begin{cases} 1 & x \in [0, 1] \\ 0 & \text{otherwise} \end{cases}.$$

What is the cdf of this uniform distribution? Sketch a graph.