Exam #2

M1220-1 Fall 2003

Name:_____ Score: _____

Each problem is worth 10 points. Give your answer and a short but complete motivation of it for full credit.

1.

$$\lim_{x \to 0^+} \frac{\sin(x) - x}{x^2} = ?$$

2.

$$\lim_{x \to 0^+} (\sin(x))^x = ?$$

3.

$$\lim_{x \to 4} \frac{\int_4^x \frac{t^2+49}{t^3+1} dt}{x-4} = ?$$

4.

$$\int_2^\infty \frac{dx}{x^4} = ?$$

5.

$$\int_{-1}^1 \frac{dt}{t^2-1} = ?$$

6.

$$\int_{-\frac{\pi}{2}}^{+\frac{\pi}{2}} \frac{\cos(x)}{\sqrt{|\sin(x)|}} dx = ?$$

7.

$$\lim_{n\to\infty} \frac{\sin(\frac{1}{n^2})}{\sinh(\frac{1}{n^2})} = ?$$

8. Decide if the following series converges or diverges. If it converges, find the value of convergence.

$$\sum_{n=0}^{\infty} 15(\frac{1}{3})^n$$

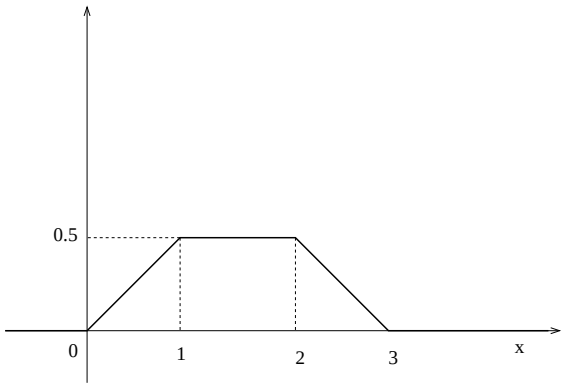
9. Determine if the following series converges or diverges:

$$\sum_{n=0}^{\infty} \frac{|\cos(n)|}{n^2}$$

10. Find the value of convergence of the following series:

$$\sum_{n=2}^{\infty} \ln(1 - \frac{1}{k^2})$$

11. EXTRA CREDIT



(a) Is this the graph of a probability density function? Why?

(b) What is the mean?

(c) What is the probability of the set of events $(1.5 < x < 2.5)$?