

**MATH 16C:
FAKE TEST 3B**

SPRING 2007

- (1) Write an expression for the n -th term, a_n , of the following arithmetic sequence

$$a_0 = 2, a_1 = 0, a_2 = -2, a_3 = -4, a_4 = -6, \dots$$

Does the series

$$\sum_{n=0}^{\infty} a_n$$

converge or diverge? Why?

- (2) Consider the following series

$$\sum_{n=0}^{\infty} 2 \frac{(-1)^n}{5^n}.$$

- a) Does the series above converge? Why or why not?
- b) If the series converges, what is its value?
- c) What is the value of the N -th partial sum?

$$S_N = \sum_{n=0}^N 2 \frac{(-1)^n}{5^n}.$$

- (3) Determine whether or not the following series converge. Give reasons for your answer.

a)

$$\sum_{n=1}^{\infty} \frac{(2n)!}{(3n)!}$$

b)

$$\sum_{n=1}^{\infty} \frac{\sqrt[5]{n}}{\sqrt[3]{n}}$$

- (4) Find the Maclaurin series for the function $f(x) = \sqrt[4]{1+x}$. What is the radius of convergence for this series?

- (5) The Taylor series for the function $f(x) = \frac{1}{x}$ centered at $a = 1$ is

$$\frac{1}{x} = 1 - (x-1) + (x-1)^2 - (x-1)^3 + \cdots + (-1)^n (x-1)^n + \cdots .$$

The radius of convergence is $|x-1| < 1$. Use this series to determine a Taylor series for $g(x) = \ln(x)$ centered at $a = 1$. Hint: Integrate.