

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

SPRING 2007

(1) Consider the following sequence:

$$a_n = \frac{4 - 3n + 5n^2}{-3n^2 + 2n - 1}.$$

a) Evaluate the following limit

$$\lim_{n \rightarrow \infty} a_n.$$

b) Based on your result in part a), does the series

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

converge or diverge? Why?

(2) Consider the following series

$$\sum_{n=2}^{\infty} \left(\frac{2}{3}\right)^n - \left(\frac{3}{4}\right)^n.$$

a) Does the series above converge? Why or why not?

b) If it converges, what is its value?

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

a)

$$\sum_{n=1}^{\infty} \frac{1}{n^{\frac{\pi}{2}}}$$

b)

$$\sum_{n=1}^{\infty} \frac{5^n}{3n+1}$$

(4) Find the Taylor series for the function  $f(x) = x^2 + 3x - 1$  at  $a = 2$ .

(5) Find the 4th degree Taylor polynomial for

$$f(x) = \frac{1}{(1-x)^2}.$$