

NAME: _____
(Last, First)

1. Are the terms $b_n = \frac{n}{n+1}$ increasing, decreasing or “not monotone”? Does the series $\sum_{n=1}^{\infty} (-1)^n \frac{n}{n+1}$ converge? Give a reason.

2. Find the ratio of the terms of the series $\sum_{n=1}^{\infty} \frac{2^n}{n3^{n+1}}$. Simplify your answer. (The correct answer includes “n”.)

Find the limit of the ratio of the terms, and determine whether the series converges.

3. Determine whether the given series converges or diverges. If you use comparison, state clearly why the comparison series converges or diverges; and how the given series compares.

$$(a) \sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2 - 4}} \quad (b) \sum_{n=1}^{\infty} \frac{4^n - 1}{5^n} \quad (c) \sum_{n=1}^{\infty} \frac{n - 1}{n^3 + 1}$$

4. Find the Taylor polynomial of the indicated degree for the given function about the given point.

(a) $f(x) = \sqrt{1 + x^2}$; $x_0 = 0$, degree 2.

(b) $f(x) = e^{-x}$; $x_0 = 0$, degree 4.

(c) Find the Taylor polynomial $P_3(x, 0)$ of the function $f(x) = \sqrt{1 + x}$.