Math 143 Midterm 1

Name: _____

1. Do these series converge? Which test are you using?

a. $\sum_{n=0}^{\infty} \frac{n^2 + 2^n}{n^4 + 2^n}$

b. $\sum_{n=0}^{\infty} \frac{(n!)^2}{(2n)!}$

c. $\sum_{n=0}^{\infty} \frac{(-1)^n}{\sqrt{n} + 3}$

2. Find the interval and radius of convergence for these series:

a. $\sum_{n=4}^{\infty} \frac{2^n}{3^n - 3} x^n$

b. $\sum_{n=1}^{\infty} \frac{1}{3n+1} (x+4)^{2n}$

3. Let $f(x) = \frac{4}{5}(1+x)^{5/2}$.

a. Find the degree 2 Taylor polynomial for $f(x)$ at $x = 0$.

b. Find a bound on the error when approximating $f(-1/2)$ by taking $x = -1/2$ in part a.

4. Find the Taylor series for $f(x) = \ln(x+1)$ centered at $x = 1$.