MATH 1953 Practice Midterm 4

Name: _____

Instructions: Please answer each question as completely as possible, and show all work unless otherwise indicated. You DO NOT need to simplify your answers unless otherwise indicated! You may use an approved calculator for this quiz. (Approved: non-graphing, non-programmable, doesn't take derivatives)

1. For each of the following series, use any of the convergence/divergence tests from our class to decide whether the series converges or diverges.

(a) $\displaystyle\sum_{n=2}^{\infty} \frac{n^2-1}{n^3+n}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{n5^n}{n!}$

(c) $\displaystyle\sum_{n=2}^{\infty} \sqrt{\frac{4n}{n+1}}$

(d) $\displaystyle\sum_{n=2}^{\infty} \frac{\cos(3n)}{1+2^n}$

2. Find the interval of convergence for the power series $\sum_{n=2}^{\infty} \frac{(-1)^n}{n^2 3^n}(x-2)^n$.

3. Suppose you are given a power series $\sum_{n=0}^{\infty} c_n(x+3)^n$ with mystery coefficients c_n. The only things you are told are that it converges at $x = -5$ and diverges at $x = 2$. Based on this information, for the following x-values whether the series must converge, must diverge, or whether there's not enough information given to know if it converges or diverges. You DO NOT have to explain your answers.

(a) $x = -1$ converges diverges not enough information

(b) $x = -9$ converges diverges not enough information

(c) $x = 1$ converges diverges not enough information

(d) $x = -4$ converges diverges not enough information