Name:

Math 107 Practice Exam 2

Note: This practice exam does not include any problems on exponential growth and decay. Be sure to include that subject in your review!]

Show all work. How you get your answer is just as important, if not more important, than the answer itself.

1. (10 pts. each) Determine the convergence or divergence of the following sequences:

(a) $a_n = \dfrac{n^3 + 6n^2 \ln n - 1}{2 - 3n^3}$

(b) $b_n = \dfrac{n^{n+\frac{1}{n}}}{(n+3)^n}$

2. (10 pts. each) Determine the convergence or divergence of the following series:

(a) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{(n-1)(\ln n)^{2/3}}$ [Hint: limit compare, <u>then</u> integral...]

(b) $\displaystyle\sum_{n=0}^{\infty} \frac{6n}{(1-n^2)^2}$

3. (10 pts. each) Determine the convergence or divergence of the following series:

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

(b) $\displaystyle\sum_{n=0}^{\infty} \frac{n2^{2n+1}}{9^n + 1}$

4. (20 pts.) Compute the radius of convergence of the following power series:

$$f(x) = \sum_{n=0}^{\infty} \frac{2^n - 1}{(n+4)^2}(x-3)^n$$

5. (20 pts.) Find the Taylor polynomial of degree 3, centered at $x = 8$, for the function

$$f(x) = x^{2/3}$$

and estimate the error in using your polynomial to approximate $f(7) = 7^{2/3}$.