

Name: _____

1. (30 pts.) Find the interval of convergence for the following power series:

$$(a) \sum_{n=1}^{\infty} \frac{(x+2)^n}{\sqrt{n}} \quad (b) \sum_{n=0}^{\infty} \frac{(-3)^{n+1}(x-5)^n}{2^{3n}}$$

2. (30 pts.) Determine whether each of the following sequences or series converges to a real number.

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

3. (20 pts.) Find the Taylor polynomial for $\sqrt[5]{x}$ of degree $n = 2$ centered at $a = 32$. Estimate the error of approximating $\sqrt[5]{30}$ with the above polynomial.

4. (20 pts.) For each of the following functions $f(x)$ find the Taylor series with center $a = 0$.

$$(a) f(x) = \frac{x^{10}}{5 - x^2} \quad (b) f(x) = \frac{x}{(1 + x)^2}$$

1	2	3	4	total (100)