

AMS 161-Midterm Review-Spring 2020

NAME: _____

*Each numbered question is worth 20% of the exam. SHOW ALL WORK!

1. Determine if each converges or diverges. Justify your answer!

a) $\sum_{n=1}^{\infty} e^{-n}$

b) $\sum_{n=1}^{\infty} \frac{(n!)^2}{2^n n^2}$

$$\text{c) } \sum_{n=1}^{\infty} \frac{1}{1+n^2}$$

$$\text{d) } \sum_{n=1}^{\infty} \left(\frac{(-1)^n}{n} + \frac{1}{n} \right)$$

2. Find the interval of convergence for $\sum_{n=1}^{\infty} \frac{(-1)^n (x+1)^{2n+1}}{n^2+4}$

3. Find the Maclaurin series for $\ln(1+2x)$ and use the ratio test to determine the interval of convergence. Check endpoints too!

4. Write a Maclaurin series for $\cos(x^3)$ and determine its interval of convergence using the ratio test.

5. Express the antiderivative of $\frac{1}{1+x^5}$ as a power series.