

Name: _____

Series! (Due 4/24/2018)

Math 1220

(Has 2 sides)

Challenge 1. Do the following series converge? Justify your answer. (Hint: all of these series appear on older class materials. You can probably guess which methods to use based on their placement.) [Tip: you may want more space to answer some of these; manage space strategically!]

(a) $\sum_{n=1}^{\infty} \frac{1}{n^n}$

(b) $\sum_{n=1}^{\infty} \tan(n)$

(c) $\sum_{n=0}^{\infty} ne^{-n^2}$

(d) $\sum_{n=1}^{\infty} \frac{2}{n^e}$

(e) $\sum_{n=2}^{\infty} \frac{5}{n^{1/3} - 1}$

Challenge 2. Find the Taylor series for $f(x) = x^4 - 3x^2 + 1$ centered at $a = 1$.

Challenge 3. Using the Maclaurin series for e^x , find

$$\lim_{x \rightarrow 0} \frac{e^x - 1 - x}{x^2}$$