

# AMS 161- Exam 1-Sample Exam Spring 2018

NAME: \_\_\_\_\_

\*Each numbered question is worth 25 points. SHOW ALL WORK!

1. Determine if each converges or diverges and justify:

a)  $\sum_{n=1}^{\infty} 7(7)^{-n}$

b)  $\sum_{n=1}^{\infty} \frac{3^n}{(3n+1)!}$

$$\text{c) } \sum_{n=1}^{\infty} \frac{(n!)^2 3^n}{(2n)!}$$

$$\text{d) } \sum_{n=1}^{\infty} \frac{(-1)^n}{n^3+1}$$

$$\text{e) } \sum_{n=1}^{\infty} 4(9 - 7^n)$$

2. Find the Maclaurin series for  $\text{Arc tan } x$  and its radius of convergence.

3. Find the Maclaurin series for  $\frac{1}{1+8x}$  and its interval of convergence.

4) Compute the following:

*a*) second degree Maclaurin polynomial for  $\cos(7x)$

*b*) an infinite geometric series whose sum is 3.

*c*) a divergent series that does not go to  $\pm \infty$