

## ALTERNATING SERIES TEST AND RATIO TEST WORKSHEET

APRIL 1, 2019

1. Determine whether each of the following series converges absolutely, converges conditionally, or diverges.

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

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

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

(d)  $\sum_{n=1}^{\infty} \frac{(-1)^n e^{1/n}}{n^3}$  (*Hint: Bound  $e^{1/n}$  above and compare.*)

2. Let  $x$  be a real number. Show that the series  $\sum_{n=0}^{\infty} \frac{x^n}{n!}$  converges absolutely. (We will soon see that this is the Taylor series for  $e^x$  centered at 0.)