

Name: \_\_\_\_\_

Professors name: \_\_\_\_\_

Due date: 10/16

1. Give the interval of convergence for the power series  $\sum_{k=0}^{\infty} \frac{(-1)^k (x-1)^{k+1}}{k+1}$ .
2. Consider  $f(x) = \ln(x)$ .
  - (a) Determine the Taylor Series for  $f(x)$  centered at  $a = 1$ .
  - (b) Does the Taylor Series converge to  $f(x)$ , and if so, for what values of  $x$ ?
  - (c) Use a graphing utility to draw  $f(x)$ ,  $p_1(x)$ , and  $p_2(x)$  on the same graph and see if your answer to part (b) makes sense.
3. Compute the area under  $g(x) = \sin(x)$  from 0 to  $\frac{\pi}{3}$  using 3 rectangles. There should be NO  $\sin(x)$  functions in your final answer. **HINT:** Choose your  $\bar{x}_i$ 's wisely to make your life easier. Also note that  $\frac{\pi}{9} < \frac{\pi}{6} < \frac{2\pi}{9}$ .
4. Compute the Riemann sum for  $f(x) = -x$  between  $x = 0$  and  $x = 3$  with 500 rectangles and left endpoints. Explain why your value is negative.