

## Homework #4 (Continued)

Math 2300 - Section 880

Due: Thursday, Nov 5

**Instructions.** Be sure to show your work and explain your reasoning for full credit. Be aware that this homework assignment also has problems from the textbook (as indicated on the course website).

NAME \_\_\_\_\_

1. Find the Taylor series for  $xe^x$  about  $x = 0$ . Then integrate term-by-term and substitute to show that the series  $\sum_{n=1}^{\infty} \frac{1}{n!(n+2)}$  converges to 1.

2. We wish to estimate  $\ln(0.5)$  using an  $n^{\text{th}}$  degree Taylor polynomial for  $\ln(1+x)$  about  $x = 0$ . How large should  $n$  be to guarantee the approximation will be within 0.0001? **Hint:** start by calculating a formula for  $|f^{(n+1)}(x)|$  and finding a bound for it between  $-1/2$  and 0.