

**Math 126: Calculus II**  
**Quiz 9** November 16, 1999

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

Suppose you are required to use Taylor's formula to calculate  $e^2$  with an error less than  $10^{-10}$ . You know  $e < 3$ , and you have the following information:

$$10^{-9} > \frac{2^{17}}{17!} > 10^{-10} > \frac{2^{18}}{18!} > 10^{-11} > \frac{2^{19}}{19!} > 10^{-12} > \frac{2^{20}}{20!}$$

$$10^{-8} > \frac{9 \cdot 2^{17}}{17!} > 10^{-9} > \frac{9 \cdot 2^{18}}{18!} > 10^{-10} > \frac{9 \cdot 2^{19}}{19!} > 10^{-11} > \frac{9 \cdot 2^{20}}{20!}$$

What is the smallest number of terms (the smallest  $n$ ) to do the approximation? (This requires estimating the remainder.) **DO NOT** actually carry out the calculation of  $e^2$ .