

Math 413, Spring 2006 — Weeks 8-9

EP8-1 Let $f(x) = e^x$.

- Find the Taylor polynomial $T_n(0, x)$ of f about the origin.
- Show that for all n

$$|e - T_n(0, 1)| \leq \frac{3}{(n+1)!}.$$

(You may use $f'(x) = e^x$, $e^0 = 1$, $e \leq 3$. You should not need to use any other facts from calculus about the exponential function.)

EP8-2 Prove that

$$\left| \cos(.01) - 1 + \frac{(.01)^2}{2} \right| \leq 10^{-9}.$$

(You may use the usual calculus rules for differentiating sine and cosine as well as $\cos 0 = 1$, $\sin 0 = 0$, $|\cos(x)| \leq 1$, $|\sin(x)| \leq 1$.)