MAT 137 **HW #7** Name _____

04/19/09 (due Thursday 04/23/09)

10 points

Show work or otherwise justify your answers. Unsupported answers (i.e. calculator output) will not receive full credit. You may check your answers with a calculator or computer.

1. (a) Find the degree-two Taylor polynomial $P_2(x)$ at $a = 0$ for the function $f(x) = \sqrt{1+3x}$. centered at $a = 0$.

(b) Use the Taylor-Lagrange derivative formula for the error to show that $|f(x) - P_2(x)|$ is less than 0.002 for $|x| < 0.1$.

2. Find the degree-three Taylor polynomial $P_3(x)$ at $a = 1$ for the function $f(x) = x^3 + x + 1$ and show that $P_3(x) = f(x)$.

3. (a) Find the Taylor series about $a = 0$ for the function $f(x) = e^{-x^2}$, by substituting into the series for e^x.

(b) Find a power series which converges for all x, whose sum $f(x)$ is an antiderivative of e^{-x^2}.