Math 143
Fall 2006
Quiz 24 - §11.8

Name: **Solutions**

Complete the following problems. Show all work to receive full credit.

1. Find the Taylor polynomial of degree 2 for $f(x) = \sqrt{x+4}$ at $a = 0$.

$$\begin{array}{rr} f(x) = \sqrt{x+4} & f(0) = \sqrt{0+4} = \sqrt{4} = 2 \\ f'(x) = \frac{1}{2}(x+4)^{-\frac{1}{2}} = \frac{1}{2\sqrt{x+4}} & f'(0) = \frac{1}{2\sqrt{0+4}} = \frac{1}{4} \\ f''(x) = -\frac{1}{4}(x+4)^{-\frac{3}{2}} = \frac{-1}{4(x+4)^{\frac{3}{2}}} & f''(0) = \frac{-1}{4(0+4)^{\frac{3}{2}}} = -\frac{1}{4\cdot 8} = -\frac{1}{32} \end{array}$$

$$f(x) \approx 2 + \frac{1}{4}x - \frac{1}{64}x^2$$

2. Find the Maclaurin series for $f(x) = e^{-x}$.

   We know that the Maclaurin series for e^x is

$$\sum_{k=0}^{\infty} \frac{x^k}{k!}$$

   so the Maclaurin series for $f(x) = e^{-x}$ is

$$\sum_{k=0}^{\infty} \frac{(-x)^k}{k!} = \sum_{k=0}^{\infty} \frac{(-1)^k}{k!} x^k$$