MATH 116-028 QUIZ 10 / 8 Apr 2008 Name:____________________________________

1. Recall that the Taylor series for $\sin(x)$ is $\sum \frac{(-1)^n x^{2n+1}}{(2n+1)!}$. Find the Taylor series for $\mathrm{Si}(x) = \int_0^x \frac{\sin(t)}{t}\, dt$. (3 points)

---

2. Suppose that we know that $\frac{dy}{dx} = f(y)$ for some function $f(y)$. Also suppose that we approximate the solution to this differential equation, with initial condition $y(0) = 0$, with Euler's method and $\Delta x = 0.5$. If we find $y(0.5) \approx 1$, $y(1) \approx 1.5$, $y(1.5) \approx 1.75$, and $y(2) \approx 1.875$, (4 points)

a. What is $\frac{dy}{dx}$ at $y = 0$, $y = 0.5$, and $y = 1$?

b. Give a rough sketch of the slope field of this differential equation.

---

3. Find all solutions to the differential equation $\frac{1}{t}\frac{dp}{dt} + p = 2$. (3 points)