Math 240
Spring 2008
Dr. Khalili

MAPLE PROJECT 2

Due date February 29, 2008

1. The **sine integral function**

$$\mathrm{Si}(x) = \int_0^x \frac{\sin t}{t}\, dt$$

is important in electrical engineering. [The integrand $f(t) = \dfrac{\sin t}{t}$ is not defined when $t = 0$, but we know that its limit is 1 when $t \to 0$. So we define $f(0) = 1$ and this makes f a continuous function everywhere].

(a) Draw the graph of Si over the intervals $[0, 3\pi/2]$, $[0, 2\,\pi]$, and $[0, 100]$.

(b) At what <u>values</u> of x does this function have local maximum or local minimum values?

(c) Find the coordinates of the first inflection point to the right of the origin.

(d) Does this function have horizontal asymptotes?

(e) Solve the following equation correct to ten decimal places:

$$\int_0^x \frac{\sin t}{t} = \frac{1}{2}$$