Question:

In this problem, $f(x) = \dfrac{1}{1+x} - \cos x$.

a) Graph $f(x)$ in the window $0 \leq x \leq 6$ and $-1 \leq y \leq 1.5$.

b) Write an equation showing how x_n, an approximation for a root of $f(x) = 0$, is changed to an improved approximation, x_{n+1}, using Newton's method. Your equation should use the specific function in this problem.

c) Suppose $x_0 = 2$. Compute the next two approximations x_1 and x_2. Explain what happens to the sequence of approximations $\{x_n\}$ as n gets large. You should use both numerical and graphical evidence to support your assertion.

d) Suppose $x_0 = 4$. Compute the next two approximations x_1 and x_2. Explain what happens to the sequence of approximations $\{x_n\}$ as n gets large. You should use both numerical and graphical evidence to support your assertion.