11. (**Dr. Ayati: F22 Midterm** – ***Abdul and Bakhtiar***) Apply two steps of Newton's method to find a root of $f(x) = cos(x)$ with initial guess $x_0 = \pi/4$.

Newton's method: $x_{k+1} = x_k - \dfrac{f(x_k)}{f'(x_k)}$

$f(x) = \cos x$

$f'(x) = -\sin x$

$x_0 = \pi/4$

$x_1 = x_0 - \dfrac{f(x_0)}{f'(x_0)}$

$= \pi/4 - \dfrac{\cos(\pi/4)}{-\sin(\pi/4)}$

$= \pi/4 + 1$

$= \dfrac{\pi + 4}{4}$

$x_2 = x_1 - \dfrac{f(x_1)}{f'(x_1)}$

$= \dfrac{\pi+4}{4} - \dfrac{\cos\left(\frac{\pi+4}{4}\right)}{-\sin\left(\frac{\pi+4}{4}\right)}$