CS 323 Quiz 5 May 8, 2019

Name:_____

Show all your work

(10) **Problem** Compute an approximation to the solution $y(0.2)$ and $y(0.4)$ of the following problem

$$y'(x) = \cos^2 y, \quad y(0) = 0,$$

with a second order Taylor method using stepsize $h = 0.2$.

Solution

$$y_1 = y_0 + h * f(x_0, y_0) + \frac{h^2}{2}(f_x + f_y f)(x_0, y_0) = 0 + 0.2 * 1 + 0.2^2/2 * 0 = 0.2$$

$$\begin{aligned} y_2 &= y_1 + h * f(x_1, y_1) + \frac{h^2}{2}(f_x + f_y f)(x_1, y_1) \\ &= 0.2 + 0.2 * \cos^2(0.2) + 0.2^2 \cos^3(0.2) \sin(0.2). \end{aligned}$$