تمرین سری ۳

$y \in (1, 1.5)$

$h = 0.1$

$(1+y)\, dy = (xy)\, dx \quad \Rightarrow \quad y' = \dfrac{xy}{1+y}$

$y(1) = 0.1$

$x_0 = 1.1 \longrightarrow \dfrac{xy}{1+y} \quad , \quad y(1) = 0.1$

$x_0 = 1.5 = \dfrac{xy}{1+y} \quad , \quad y(1,5) \cong 0.1 \quad \boxed{}$

$\sqrt{?}\,10 = \dfrac{xy}{1+y} \quad , \quad y(1,5) \cong 0.1 \quad \boxed{0.438}$

$y(0,4)$

$h = 0.2$

$y' = \cos(x+y)$

$y(0) = 1$

$k_1 = 0.2(\cos(0+1)) = 0.108$

$k_2 = 0.2(\cos(x_n + 0.2, y_n + k_1)) = 0.2(\cos(0.2 + (1+0.108))) = 0.07$

$y_{n+1} = y_n + \frac{1}{2}(k_1 + k_2) = 1 + \frac{1}{2}(0.108 + 0.07) = 1.934$