Section 8.3 - Euler's Method

Use Euler's Method with the given step size Δx or Δt to approximate the solution of the initial-value problem over the stated interval. Present your answer as a table and as a graph.

7. $\frac{dy}{dx} = \sqrt[3]{y}, y(0) = 1, 0 \le x \le 4, \Delta x = 0.5$

8. $\frac{dy}{dx} = x - y^2, y(0) = 1, 0 \le x \le 2, \Delta x = 0.25$

9. $\frac{dy}{dt} = \cos y\,, y(0) = 1, 0 \le t \le 2, \Delta t = 0.5$

10. $\frac{dy}{dt} = e^{-y}, y(0) = 0, 0 \le t \le 1, \Delta t = 0.1$

11. Consider the initial-value problem $y' = \sin \pi t\,, y(0) = 0$. Use Euler's Method with five steps to approximate $y(1)$.

20. Consider the initial-value problem $y' = \frac{\sqrt{y}}{2}, y(0) = 1$.
    a. Use Euler's Method with step sizes of $\Delta x = 0.2, 0.1, 0.05$ to obtain three approximations of $y(1)$.
    b. Find $y(1)$ exactly. *Hint: Solve the initial-value problem.*