Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Use Euler's method to find the value of $y(0.5)$ given the differential equation $\frac{dy}{dt} = -\frac{1}{3}xy + 1$ given the initial conditions $y(1) = 2$ in five steps. (Note: Δt is negative.)

2. Verify that $y(x) = \frac{1}{\sqrt[3]{3\cos x + 8}}$ is a solution to the differential equation $\frac{dy}{dx} = y^4 \sin x$, $y\left(\frac{\pi}{2}\right) = \frac{1}{2}$.