Math 222 - Quiz 6 **Section:** _____ **Name:** _____

Problem 1 The natural logarithm satisfies the initial value problem $y'(x) = \dfrac{1}{x}$, where $y(1) = 0$. Use Euler's method with a step-size of $h = \frac{1}{3}$ to approximate $\ln 2$.

Problem 2 We start with a full 10,000 gallon vat containing a solution of 3% acid. There is a pipe brining in a solution of 5% acid at a rate of 10 gallons per minute, and another pipe removing the mixed solution from the vat at a rate of 15 gallons per minute. Write out a differential equation, with any necessary initial conditions, that describes the total amount of acid (in gallons) in the vat at any given time t (in minutes). **You do not need to solve this differential equation**