Consider the differential equation $\frac{dy}{dx} = 1 - y$. Let y = f(x) be the particular solution to this differential equation with the initial condition f(1)=0. For this particular solution, f(x) < 1 for all values of x.

a) Use Euler's Method, starting at x = 1 with two steps of equal size, to approximate f(0). Show the work that leads to your answer.

Consider the differential equation $\frac{dy}{dx} = 3x + 2y + 1.$

b) Let y = f(x) be a particular solution to the differential equation with the initial condition f(0) = -2. Use Euler's method, starting at x = 0 with a step size of .5, to approximate f(1). Show the work that leads to your answer.

Consider the differential equation $\frac{dy}{dx} = 5x^2 - \frac{6}{y-2}$ for $y \neq 2$. Let y = f(x) be the particular solution to this differential equation with the initial condition f(-1) = -4.

d) Use Euler's Method, starting at x = -1 with two steps of equal size, to approximate f(0). Show the work that leads to your answer.

Let f be the function satisfying $f'(x) = -3xf(x)$, for all real numbers x, with f(1) = 4 and $\lim_{x \to \infty} f(x) = 0.$

a) Use Euler's Method, starting at x = 1 with a step size of .5, to approximate f(2).

Let f be the function whose graph goes through the point (3, 6) and whose derivative is given by $f'(x) = \frac{1+e^x}{x^2}$

b) Use Euler's Method, starting at x = 3 with a step size of .05, to approximate f(3.1). Use f'' to explain why this approximation is less f(3.1).

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Consider the differential equation $\frac{dy}{dx} = y^2(2x+2)$. Let y = f(x) be the particular solution to the differential equation with initial condition f(0) = -1.

a) Use Euler's method, starting at x = 0 with two steps of equal size, to approximate f(.5).

7. Given that y(1) = - 3 and $\frac{dy}{dx}$ = 2x + y, what is the approximation for y(2) if Euler's Method is used with step size of .5, starting at x =1.

A) -5 B) -4.25 C) -4 D) -3.75 E) -3.5

Let y = f(x) be the solution to the differential equation $\frac{dy}{dx} = x - y$ with initial condition f(1) = 3. What is the approximation for f(2) obtained by using Euler's Method with two steps of equal length starting at x =1?

A) $\frac{-5}{4}$ B) 1 C) $\frac{7}{4}$ D) 2 E) $\frac{21}{4}$

7. Let y = f(x) be the solution to the differential equation $\frac{dy}{dx} = x - y - 1$ with the initial condition f(1) = -2. What is the approximation for f(1.4) if Euler's Method is used, starting at x =1 with two steps of equal size.

A) -2 B) -1.24 C) -1.2 D) -0.64 E) 0.2