

Differential Equations

Let $y = f(x)$ be a particular solution to the differential equation $\frac{dy}{dx} = \frac{x}{y}$, with $f(1) = 2$.

- a) Find the particular solution $y = f(x)$ with initial condition $f(1) = 2$.
- b) Use Euler's Method, starting at $x = 1$ with 2 steps of equal size to approximate $f(2)$. Show the computations that lead to your answer.

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

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

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Let f be a function with $f(4) = 1$ such that all points (x, y) on the graph of f satisfy the differential equation $\frac{dy}{dx} = 2y(3 - x)$.

- a) Find $f(x)$

6. Consider the differential equation $\frac{dy}{dx} = x^4(y - 2)$.

- a) Find the particular solution $y = f(x)$ to the given differential equation with the initial condition $f(0) = 3$.

- b) Use Euler's Method, starting at $x = 0$ with 2 steps of equal size to approximate $f(1)$. Show the computations that lead to your answer.