

Euler's Method

Learning Objectives

- Use Euler's Method to approximate the solution of a differential equation
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Use Euler's Method to approximate the solution of a differential equation

1. Consider the differential equation $\frac{dy}{dx} = x(y^2 - \sqrt{y})$, $y(1) = 2$. Estimate the value of $y(2)$ using $\Delta x = 0.5$. Round your answer to two decimal places.

2. Consider the differential equation $\frac{dy}{dx} = 2x - 4y$, $y(0) = 3$. Estimate the value of $y(1)$ using five steps. Round your answer to three decimal places.

- $y_{n+1} = y_n + f(x_n, y_n)\Delta x$
- $\Delta x = \frac{b-a}{n}$ where a is the starting value of x , b is the stopping value of x , and n is the number of steps to get from a to b .

ANSWER KEY

1. $y(2) \approx 10.06$
2. $y(1) \approx 0.376$