6.6 Euler's Method

Euler's Method is used to approximate the solution to a differential equation by using Δx increments

$y_{n+1} = y_n + f(x_n, y_n)\Delta x$, where $\frac{dy}{dx} = f(x, y)$

Show that the given function is a solution of the differential equation.

1. $y' = \frac{-2y}{3x}$ $y = -3x^{\frac{-2}{3}}$

Solve the following separable differential equations in 2 and 3.

2. $\frac{dy}{dx} = x - 1 + xy - y$

3. $\frac{dy}{dx} e^{2x} = \csc y$ and $y = 0$ when $x = 0$

Use the first 3 steps for Euler's Method in problems 4 – 7

4. $\frac{dy}{dx} = \frac{y}{x}$ $y(2) = 2$ $\Delta x = 0.1$

5. $y' = \frac{y(1 + x^2)}{x^2}$ $y(1) = 1$ $\Delta x = 0.1$

6. $y' = \dfrac{\sqrt{1 - y^2}}{x}$ $y(1) = \dfrac{1}{2}$ $dx = 0.1$

7. $\dfrac{dy}{dx} = x - 1 + xy - y$ $y(1) = -1$ $\Delta x = 0.1$