
Show all appropriate work.

1. (a) Use MATLAB to draw the direction fields for the differential equations

$$\frac{dy}{dx} = y^{4/3} \tag{1}$$

$$\frac{dy}{dx} = y^{2/3} \tag{2}$$

- (b) If we give both differential equations the initial condition $y\left(\frac{-3}{2}\right) = -1$ then eqn. 1 has the solution $y = \frac{-1}{(x+\frac{5}{2})^3}$ and eqn. 2 has solution $y = \left(\frac{1}{3}x - \frac{1}{2}\right)^3$.

- i. Show that these are solutions to the initial value problems.
 - ii. Graph the exact solutions on top of their respective direction fields.
2. (a) Use the MATLAB code provided to approximate solutions to the initial value problems from the previous problem using Euler's method. The differential equation that `Euler.m` solves is defined in the file `MyFunction.m`. It is currently written to solve eqn. 1. You will need to change this file to solve eqn. 2.
- (b) Plot the difference between the approximate solution and the exact solution to eqn. 1 on the interval $\left[\frac{-3}{2}, 3\right]$ using a step size of $h = 0.5, 0.1, 0.05$.