Numerical Analysis -2

Homework #1

Equation is given

$$y' = -xy^2\,, \qquad y(0) = 2$$

Exercise 1.

Apply the simple Euler method, computing up to $x = 1$ with $h = 0.5\,, 0.2\,, 0.1\,, 0.01$
Do the result appears to converge towards the exact solution $y(1) = 1$?

Exercise 2.

Apply the midpoint formula with $h = 0.1$ to obtain $y(1)$.

Exercise 3.

Apply the modified Euler method with $h = 0.1$ to obtain $y(1)$.

Exercise 4.

Apply the Runge-Kutta method with $h = 0.1$ to obtain $y(1)$.

Exercise 5.

Apply the predictor-corrector of Milne with $h = 0.1$ to obtain $y(1)$.

Exercise 6.

Apply the predictor-corrector of Adams with $h = 0.1$ to obtain $y(1)$.

Exercise 7.

Compare the results.