Assignment - 9

1) Use Heun's method to numerically solve the following equation.

$$dy/dx = -2x^3 + 12x^2 - 20x + 8.5,$$

from x=0 to x=4 with step size 0.5. The initial condition is y=1 at x=0.

Compare your result with the soultion obtained using the Euler's method and exact solution by printing your output in separate columns. Also print the percentage error in both the cases.

Exact solution: $y = -0.5x^4 + 4x^3 - 10x^2 + 8.5x + 1$

Print your results in different columns as shown below. Then plot the solutions w.r.t "x" using gnuplot for Euler, Heun and exact.

x	y_{exact}	y_{Heun}	% error$_{Heun}$	y_{Euler}	% error$_{Euler}$