Numerical integration

1) Compute the 4th order Runge-Kutta values (K_1, K_2, K_3, and K_4) used to solve the exponential equation:

$$y' = y$$

for **one step** using the initial condition $(x_0, y_0) = (4.5, 1)$ and $\Delta x = 2$. Compare this to one step of Heun's method and **calculate the relative error for both**.

2) Compute the minimum degree Lagrange interpolating polynomial for the following set of nodes:

x	$\frac{1}{3}$	$\frac{1}{4}$	1
f(x)	2	-1	7

3) Compute the following integral using Simpson's Rule:

$$\int_0^1 (1 + x^2)^{-1} dx$$

using partition points at $x = 0, 0.5$, and 1. **What is the relative error (you can use Wolfram to integrate)?**