Math 333
Numerical Simulations Problem

Consider the initial-value problem

$$\frac{dy}{dt} = \frac{t^2}{y}, \quad y(0) = 2.$$

1. Use Euler's method with $\delta t = 0.5$ to approximate $y(1)$.
2. Use Euler's method with $\delta t = 0.25$ to approximate $y(1)$.
3. Use Euler's method with $\delta t = 0.1$ to approximate $y(1)$.
4. Use the Runge-Kutta Fehlberg method (i.e. the dsolve,numeric command in Maple discussed in class) to approximate $y(1)$.
5. Find the exact value of $y(1)$ by solving the initial-value problem explicitly.
6. Briefly discuss the accuracy of your results.