MATLAB HW1

Consider the logistic model with periodic harvesting:

$$\frac{dp}{dt} = kp(1 - p/N) - a(1 + \sin(t)).$$

with $k = 0.25$, $N = 4$ and $a = 0.25$.

1. Draw the slope field for this equation, using the range $t \in [0, 6]$ and $p \in [0, 6]$.

2. Use ode45 to solve the initial value problem with the initial value $p(0) = 4$. Draw the numerical solution. What is the numerical value of $p(6)$ obtained in this way?

3. Write a code for realizing the Euler's method and use it to solve the ODE numerically with initial value $p(0) = 4$, by using the step sizes 1.5 and 0.5. Draw the two obtained set of numerical data. What is the numerical value of $p(6)$ for each of these two cases? Compare to the numerical value obtained from ode45.