Euler's Method
Math 230

1. Use Euler's method to approximate the solution to $\frac{dy}{dt} = 2y - \sin(t)$ with $y(0) = 3$.

    (a) First, approximate $y(1)$ with a step size of $\Delta t = 0.02$

    (b) How does the approximation of $y(1)$ change as you decrease the step size?

    (c) Can you use Euler's method to obtain an approximation of $y(1)$ that is within 0.001 of the exact value? How would you know if you obtain this accuracy?

2. Use Euler's method to approximate the solution to $\frac{dy}{dt} = 2e^t \sin(4t) + y$ with $y(0) = 0$.

    (a) Experiment with some different step sizes Δt. How does the approximation of $y(1)$ change as you decrease the step size?

    (b) Can you use Euler's method to obtain an approximation of $y(1)$ that is within 0.001 of the exact value? How would you know if you obtain this accuracy?