

Math 1B Discussion Problems 2 Apr

1. Show that $y = \frac{2}{3}e^x + e^{-2x}$ is a solution of the differential equation $y' + 2y = 2e^x$.
2. Verify that $y = -x \cos x - x$ is a solution of the initial value problem $x \frac{dy}{dx} = y + x^2 \sin x, y(\pi) = 0$.
3. Sketch the direction field of the differential equation. Then use it to sketch a solution curve that passes through the given point.
 - (a) $y' = y^2 - 1, (0, 0)$
 - (b) $y' = y + xy, (0, 1)$
4. Use Euler's method to calculate the first three approximations to the given initial value problem for the specified step size.
 - (a) $y' = x(1 - y), y(1) = 0, h = 0.2$
 - (b) $y' = y^2(1 + 2x), y(-1) = 1, h = 0.5$