Spring 2024 − Math 3331− Homework 5 - Q1 solns

1. Solve the following ODEs

    (i) $y'' = 1 + y'^2$

    (ii) $xy'' + y'^2 = y', \ \ y(1) = 2, \ y'(1) = 1$

    (iii) $\dfrac{d^2y}{dx^2} + \dfrac{1}{y^3} = 0$

    (iv) $yy'' + y' = y'^2$

Solns:

    (i) $y = -\ln|\cos(x + c_1)| + c_2$

    ii) $y = x + 1$

    (iii) $c_1 y^2 + 1 = (c_1 x + c_2)^2$

    (iv) $y = (c_2 e^{c_1 x} - 1)/c_1$