

Problem Set #33

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Problem 1

$$(c) \ (1 + \tan y)y' = x^2 + 1 \implies \int (1 + \tan y) dy = \int (x^2 + 1) dx \implies y - \ln |\cos y| = \frac{x^3}{3} + x + C$$

Problem 4

$$\begin{aligned} \frac{dy}{dx} = x + y &\implies \left[\begin{array}{l} u = x + y \\ \frac{du}{dx} = 1 + \frac{dy}{dx} \end{array} \implies \frac{dy}{dx} = \frac{du}{dx} - 1 \right] \frac{du}{dx} - 1 = u \implies du = (1 + u) dx \\ \implies \frac{1}{1 + u} du = dx &\implies \int \frac{1}{1 + u} du = \int dx \implies \ln |1 + u| = x + C_1 \\ \implies |1 + u| = C_2 e^x &\implies 1 + x + y = \pm C_2 e^x \implies \boxed{y = C e^x - x - 1} \end{aligned}$$