

# Homework 1

1. Solve the differential equations

$$\begin{aligned}\frac{dy}{dx} &= e^{2x+3y}, \\ y' &= \cos^2 x \cos^2(2y), \\ \frac{dy}{dx} &= \frac{y^2 + 2y + 1}{x^2 - 4x + 3}, \\ e^x y' - e^y &= 0.\end{aligned}$$

2. Solve the initial value problems

$$\begin{aligned}y' &= (1 - 2x)y^2, \quad y(0) = -\frac{1}{6}, \\ xdx + ye^{-x}dy &= 0, \quad y(0) = 1, \\ y' &= \frac{3x^2 - e^x}{2y - 5}, \quad y(0) = 1, \\ xdy + ydx &= 0, \quad y(0) = 2.\end{aligned}$$