Problem 1. Find a solution to the initial value problem:

\[ \frac{dy}{dx} = e^{y}x^3 \]

With initial value \( y(0) = 0 \).

Problem 2. Find a solution to the initial value problem:

\[ \frac{dy}{dx} = y\sqrt{y^2 - 1}\cos(x) \]

With initial value \( y(0) = 1 \).

Problem 3. Find the general solution to the differential equation

\[ \frac{dy}{dx} = x^2 + y^2x^2 \]
Problem 4. Find the general solution to the differential equation (for \( x \neq 0 \)):

\[
\frac{dy}{dx} = \frac{-y + x}{x}
\]

Problem 5. Find the general solution to the differential equation

\[
\frac{1}{2x} \frac{dy}{dx} = y + e^{x^2}
\]

Problem 6. Find a solution to the initial value problem

\[
\cos(x) \frac{dy}{dx} = 1 - \sin(x)y
\]

With initial value \( y(0) = 1 \).