Sample Exam 1.

1. Solve the initial value problem \( \frac{dy}{dx} = \frac{x^3}{\sqrt{1+x^2}}, \quad y(0) = -1.\)

2. Solve the initial value problem \( x \frac{dy}{dx} - 2y = x^2, \quad y(1) = 1.\)

3. Find a general solution of \( \frac{dy}{dx} + 2y = y^2.\)

4. Find a general solution of \((y + \cos y - \cos x)dx + (x - x \sin y)dy = 0.\)

5. Find a general solution of \((3xy - y^2)dx + x(x - y)dy = 0.\)