

**Sample Exam 1.**

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