

**MAT 235 – Ordinary Differential Equations
Make Up Exam #1**

- 1) (15 points) Solve $y' = \sin^2(x - y + 1)$

- 2) (20 points) Solve the following initial-value problem:
 $xy' + y = y^2 \ln x, x > 0; \quad y(1) = \frac{1}{5}$

- 3) (20 points) Solve $y(x + y + 1)dx + (x + 2y)dy = 0$

- 4) (10 points) Find the general solution of $y = xy' - \sqrt{y'}$, $y' > 0$.
Find a singular solution, if any.

- 5) (20 points) Find the orthogonal trajectories of the family of curves $x^2 - y^2 = cx$.

- 6) (15 points) Solve the initial value problem:
 $y'' + (y')^3 y = 0, \quad y(0) = 1, \quad y'(0) = -1$