WRITE YOUR NAME:

MAP 2302 Test 1 Thursday September 25th
Total possible score: 18 points

Question 1. Given $y = xe^{7x}$, find $y' - 7y$ and simplify.

Question 2. Find an explicit general solution of the differential equation.

$$\frac{dy}{dx} = 5x^4 y$$

Question 3. Find an explicit general solution of the differential equation.

$$y' + \frac{1}{x}y = 3x + 8$$

Question 4. Find an explicit solution of the initial value problem.

$$\frac{dy}{dx} = 3x^2(y-2), \qquad y(0) = 7$$

Question 5. Find an explicit solution of the initial value problem.

$$(2xy + 5)\,dx + (x^2 - 1)\,dy = 0, \qquad y(2) = 3$$

Question 6. Solve the differential equation.

$$(2xy)\,dx + (y^2 - 3x^2)\,dy = 0$$

HINT: Start by multiplying both sides by y^{-4}.

Question 7. Solve the initial value problem.

$$y'' + 7y' + 12y = 0, \qquad y(0) = 11, \qquad y'(0) = -38$$

Question 8. Solve the initial value problem.

$$y'' + 6y' + 9y = 0, \qquad y(0) = 4, \qquad y'(0) = 5$$

Question 9. Solve the initial value problem.

$$\frac{dy}{dx} = \frac{xy - y^2}{x^2}, \qquad y(1) = \frac{1}{2}$$

HINT: Start with the substitution $v = y/x$.