

Name: (please print name as it appears in Canvas here →) _____.

MATH 334:

SURPRISE ATTACK MISSION 2: FIRST ORDER ODES [10PTS]

Show all work. Box answers. The solution should be written on separate paper, single sided and this sheet serves as the cover sheet which is to be stapled in the upper left corner in such a way it does not obscure work on the pages which follow. The instruction "solve" means to derive the general solution to the given differential equation.

Let me reiterate, do not attempt to solve these problems on this page, rewrite the problem and solve it on another sheet. Problems should be labeled and solved in the order given. White space must be given between problems. Thanks!

Problem 1 Explicitly solve $\frac{dy}{dx} = \frac{x}{xy + 3y}$ given the solution contains the point $(1, -2)$.

Problem 2 Find the general explicit solution of $\frac{dy}{dx} - \frac{3y}{x} = 2x^4 e^{x^2}$

Problem 3 Solve $\frac{dy}{dx} = \cos^2(y) \tan x$.

Problem 4 Find the explicit solution of $\frac{dy}{dx} = x e^{x^2+y}$.

Problem 5 Find the explicit general solution of $x \frac{dy}{dx} + 4y = x^3 - x$.

Problem 6 Solve $\frac{dx}{dy} = x + y$.

Problem 7 Solve $\frac{dz}{dt} = \frac{z^2 - 3z + 2}{t^2 + 1}$ for t as an explicit function of z .

Problem 8 Consider $\vec{F} = \langle x^2, y^3 \rangle$.

- (a.) Derive the streamline of $\vec{F}$ through (x_o, y_o) as a path.
- (b.) Derive the streamline of $\vec{F}$ through (x_o, y_o) in Cartesian form.
- (c.) Show the path serves as a parametrization of the Cartesian form of the streamline.

Name: (please print name as it appears in Canvas here →) _____.

MATH 334:

SURPRISE ATTACK MISSION 2: AGAIN! [5PTS]

Show all work. Box answers. You have 5 minutes to complete this, when you're done you can turn it in and leave. Be sure your name is printed above. I don't need signatures, I need carefully written names which match what is in Canvas. Thanks! This is closed book.

Problem 5 Find the explicit general solution of $x \frac{dy}{dx} + 4y = x^3 - x$.