

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

MATH 334:

SAM 10: SYSTEMS OF LINEAR ODES [15PTS]

In each problem below, the instruction **solve** means you are to find the general explicitly real solution to the problem. Thanks! Box answers for credit.

Problem 1 (5pts) Consider $A = \begin{bmatrix} 1 & 4 \\ -1 & -3 \end{bmatrix}$. Solve $\frac{d\vec{r}}{dt} = A\vec{r}$.

Problem 2 (3pts) Find the integral curve of the vector field $\vec{F} = \langle x + 4y, -x - 3y \rangle$ through the point (x_o, y_o) .

Problem 3 (4pts) Let $v_1 = a_1 + ib_1$ and $v_2 = a_2 + ib_2$ be nonzero complex vectors where a_1, a_2, b_1, b_2 are real 4-component vectors. Find the general solution of $\frac{d\vec{r}}{dt} = A\vec{r}$ given that:

$$(A - 3iI)v_1 = 0 \quad \& \quad (A - 3iI)v_2 = v_1.$$

Problem 4 (3pts) Find the integral curve for the vector field $\vec{F} = \langle 2x, -x-4y-z, 5y+2z \rangle$ through the point (x_o, y_o, z_o) .