MATH 341 Fall 2023, POULTRY QUIZ (November 23)
A vegetarian version of this quiz is available on request.

1. Find the general solution to the system $\vec{x}\,' = \begin{bmatrix} 3 & -2 \\ 4 & -1 \end{bmatrix} \vec{x}$.

2. Suppose some system $\vec{x}' = A\vec{x}$ has general solution $\vec{x} = c_1 \begin{bmatrix} \cos 2t \\ \cos 2t - \sin 2t \end{bmatrix} + c_2 \begin{bmatrix} \sin 2t \\ -\cos 2t + 2\sin 2t \end{bmatrix}$.

Find the solution to the IVP with initial condition $\vec{x}(0) = \begin{bmatrix} -1 \\ 3 \end{bmatrix}$.

3. Find the critical points for the system below. Write your answer as a list of xy-pairs, like "$(3,4)$, $(-2,5)$, and $(0,0)$". (That's not really the answer!)

$$\begin{cases} x' &= x - y \\ y' &= x^2 + y^2 - 2 \end{cases}$$

4. Solve the phase plane equation for the system $\begin{cases} x' &= y \\ y' &= y^2 + ye^x \end{cases}$

5. When and where is your final exam for this class?