Sample exam 3.

Open book, open notes, no calculators, no cooperation.

1. Solve the phase plane equation for the system $\frac{dx}{dt} = x^2 - 2y^{-3}, \frac{dy}{dt} = 3x^2 - 2xy$.
2. Find all the critical points of the system $\frac{dx}{dt} = y^2 - 3y + 2, \frac{dy}{dt} = (x-1)(y-2)$.
3. Find a general solution to the system $x' = x - y, y' = y - 4x$.
4. Solve the initial value problem $x' = 4x + y, y' = -2x + y,\ x(0) = 1,\ y(0) = 0$.
5. Solve the phase plane equation for $x' = 3/y, y' = 2/x$, and sketch several representative trajectories with their orientation.