Review Sheet for 1st exam, which is Monday 9/29

problem sessions:

Thursday 4-5:30 LCB 323 (not here!)
Saturday 10-11:30 JWB 335 (here!)

Chapter 1: Methods to solve certain 1st order DE's

integration, for $\frac{dy}{dx} = f(x)$

position, veloc, accel, when accel is a fcn of t alone.

separable DE's

growth & decay (exponential)

populations, radioactive decay, Newton's law of cooling (with constant ambient temp.)
drug elimination, rumor propogation, disease spread.
NO TORRICELLI ON EXAM

linear 1st order DE's

mixing problems

slope fields and phase diagrams to understand qualitative behavior of sol'ns without knowing formula for solution fcn.

How to draw these, especially for autonomous DE's.

Chapter 2: Applications in depth

population models: logistic, doomsday/extinction, harvesting logistic;
understand derivations, how to find solutions (by separating variables), how to plot slope fields & phase portraits, how to find equilibrium solutions and evaluate stability/instability.

equilibrium sol'ns & stability for general 1st order autonomous DE's.

acceleration-velocity models, especially linear drag (force proportional to velocity.)

NO NUMERICAL METHODS (2.4-2.6) ON EXAM.

Chapter 3: Linear systems and matrices

solving linear systems by creating the augmented matrix, using elementary row ops to get rref, deducing solution by backsolving.

geometric meaning of linear systems in 2 or 3 variables

Matrix algebra: addition, scalar multiplication, matrix multiplication
What algebra rules hold, and which one(s) don't.

Matrix inverses

how to compute via row operations
how to solve linear systems with the inverse matrix, if the inverse exists.

Determinants

how to compute with cofactors
how to compute with row ops
Cramer's rule
Adjoint formula for the inverse, esp. 2×2 & 3×3 cases.