

Math 2250-1

Review sheet for exam 1, which is Monday 10/6

problem session

Saturday (10/4) 10:30-12:00
LCB 219

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

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

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

separable DE's

growth & decay (exponential)

populations, radioactive decay, Newton's law of cooling (with constant ambient temp.)
drug elimination, rumor propagation, 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 fun.

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/unstability.

equilibrium sol'tns & 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 back-solving.

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.