Ordinary Differential Equations
Outline for Exam 1

10/12/2022

NO BOOKS OR NOTES WILL BE PERMITTED!
NO ELECTRONIC DEVICES (INCLUDING CALCULATORS) WILL BE PERMITTED!

I. **Foundational Material**

    A. Basics of Complex Numbers

    B. Partial Derivatives

II. **Analytic Techniques for First-Order ODEs**

    A. Separable Equations

    B. First-Order Linear Equations

    C. Homogeneous First-Order Equations

    D. Bernoulli Equations

    E. Exact Equations

    F. Existence and Uniqueness of Solutions

III. **Applications of First-Order ODEs**

    A. Exponential Growth and Decay

    B. Logistic Growth

    C. Newton's Law of Cooling

    D. Single Compartment Mixing Problems

    E. Simple Physics Applications (objects falling near Earth with air resistance)