

MATH 231, FALL 2008- OUTLINE OF TOPICS

(Numbers in parenthesis refer to lessons in *Tenenbaum-Pollard*)

1. First-order equations.

Equations with separable variables (6C)/Equations with homogeneous coefficients (7)/ Exact differential equations (9)/Linear first-order equations (11ABC)/ Bernoulli equations (11D)/ Applications (14B, 15, 17)

2. Second-order linear equations

(complex numbers are needed- review material in lesson 18)

Homogeneous equations with constant coefficients(20)/Non-homogeneous equations (21,22)/Non-constant coefficients: reduction of order (23)/ applications: harmonic motion, damped motion, mechanics, circuits (ch. 6)

3. Systems of first-order equations.

2X2 homogeneous systems: eigenvalues, phase-plane diagrams/ solution methods: linear algebra, substitution/ non-homogeneous systems/Applications in mechanics: coupled springs (33A), motion under central force (34)/ solution of special second-order equations (35)/ other applications (36)

4. Series methods.

Power series solutions of linear DEs (37)/Legendre DE and Legendre polynomials (41)/ The Bessel DE (42)

5. Laplace transform (27)