

MAP 2302 MIDTERM STUDY GUIDE

- 1.) Solving an initial value problem (IVP) for a separable equation. (Reference: Examples 1, 2, and 3 on pages 41–44 and the homework (graded and suggested) pertaining to Section 2.2.)
- 2.) Solving an IVP for a linear first order equation. You should be prepared to carefully explain why the equation is linear. (Reference: Example 1 on page 51 and the homework (graded and suggested) pertaining to Section 2.3.)
- 3.) Solving an exact equation. You should be prepared to carefully explain **why** the equation is exact (i.e. you should know Theorem 2 on page 61). (Reference: Examples 1, 2, and 3 on pages 59–64 and the homework (graded and suggested) pertaining to Section 2.4.)
- 4.) An applied problem based on Newton's Law of Cooling. The law $dT/dt = k(M - T)$ will be provided on the test. However, you will be asked to **solve** the corresponding differential equation with M as specified in the concrete problem. (Reference: Handout on Newton's Law of Cooling and Exercise 34 on page 48.)
- 5.) A mixing problem. (Reference: Examples 1 and 2 on pages 96–98 and the homework from Section 3.2 (graded and suggested) pertaining to mixing problems.)
- 6.) An applied problem based on the logistic model (spreading of a virus or rumor). (Reference: class notes; handout on logistic equation.)
- 7.) Solving initial value problems for homogeneous second order linear constant coefficient ODEs. You should be able to do all three cases: two real roots, repeated real root, and two complex roots of characteristic equation. (Reference: homework (graded and suggested) pertaining to Sections 4.2 and 4.3.)