

Topics for Midterm Two

For the exam, you should be able to:

- **Give examples of D.E.'s that are unsolvable or solvable** using the methods you have learned (Separation of variables, Integrating Factor, or y_p plus y_h), and provide an explanation for your classification by either solving the DE or discussing why none of the methods work.
- **Solve a D.E. without being told which method to use** (or explain why it cannot be solved using our current methods)
- **Explain how/why the Integrating Factor Method works** (by referring to the product rule, not just a formula)
- **Describe a differential equation using the words:** homogeneous/non-homogeneous, linear/non-linear, 1st/2nd order, constant/variable coefficient
- **Solve word problems** by setting up a differential equation and initial condition, solving the IVP, and interpreting the meaning of your answer with respect to the word problem. This may require using a substitution, which would be given (like in the Free Fall handout).
NOTE: Naming of variables and clear explanations will be required for full credit on the exam
- **Sketch and discuss direction fields using the words:** isoclines, constant (equilibrium) solutions, inflection points, concave/convex, stable/unstable, long term behavior, asymptote
- **Use the definition of linear function** to determine whether or not a given function is linear
- **Compose linear functions**