

Exam 1 Review

The first exam will be on **Wednesday, March 1st**. It will cover 1.1-1.2 and 2.1-2.5. The exam will consist of questions worth various values for a total of 125 points. Prepare well and good luck!

You will need to be able to:	
1.	Verify a given explicit function or implicit expression is a solution to a DE.
2.	Classify differential equations as separable, linear, exact, homogeneous, or Bernoulli. Solve various types of differential equations and initial value problems.
3.	Find the interval of definition for a solution.
4.	Sketch solution curves on a direction field. Based on the direction field, determine the behavior of y as $t \rightarrow \infty$. If this behavior depends on the initial value of y at $t = 0$, describe the dependency.
5.	Use Theorem 1.2.1 to determine an interval in which an IVP has a unique solution.

Chapter 1 Review Exercises, pages 33-34: # 7 – 12, 17, 18, 19, 23, 24, 25, 27 – 33 odd

Chapter 2 Review Exercises, pages 80-82: # 9, 10, 11, 17, 18, 19, 21 – 23, 25 – 30

Additional Problems:

1. Find the value of y_0 for which the solution of the IVP

$$y' - y = 1 + 3\sin t, \quad y(0) = y_0$$

remains finite as $t \rightarrow \infty$.

2. Determine (without solving) an interval in which the IVP has a unique solution.

a) $(4 - t^2)y' + 2ty = 3t^2, \quad y(-3) = 1$

b) $(\ln t)y' + y = \cot t, \quad y(2) = 3$

Answers to Additional Problems:

1. $y_0 = -\frac{5}{2}$

2. a) $t < -2$
 b) $1 < t < \pi$