MATH 2610 - STUDY GUIDE FOR TEST 1

VANDERBILT UNIVERSITY

(1) The following formulas, and only these formulas, will be provided in the test:

$$x(t) = e^{-\int P(t)\,dt}\left(\int e^{\int P(t)\,dt} Q(t)\,dt + C\right).$$

$$W(x_1, x_2) = x_1 x_2' - x_1' x_2.$$

$$x_p(t) = -x_1(t)\int \frac{f(t)x_2(t)}{a(t)W(x_1,x_2)(t)}\,dt + x_2(t)\int \frac{f(t)x_1(t)}{a(t)W(x_1,x_2)(t)}\,dt.$$

$$x_2(t) = x_1(t)\int \frac{e^{-\int p(t)\,dt}}{(x_1(t))^2}\,dt.$$

These formulas will be provided as they are here. In particular, it will not be indicated for which kind of equation or in which context each formula applies. You need to recognize them from class and the homework.

(2) There will be no complicated algebra or complicated integral to be performed in the test.

(3) You will not be told which method you need to use for a given differential equation.

(4) You will need to know the statements of the theorems discussed in class and how to use such theorems. While there have been many theorems presented in class, note that you need to know only a few, corresponding to the most general cases. For example, the theorem on existence and uniqueness of solutions to initial-value problems for first-order linear differential equations is a particular case of the theorem on existence and uniqueness of solutions to initial-value problems for general, not necessarily linear, first-order differential equations. Similarly, the theorem on existence and uniqueness of solutions to initial-value problems for second-order linear constant coefficients differential equations is a particular case of the theorem on existence and uniqueness of solutions to initial-value problems for linear variable coefficients differential equations.

(5) You will not be asked to prove any theorem.