

Quiz 5

Ordinary Differential Equations

Name: _____

Prof. Ron Buckmire

Time Begun: _____

ASSIGNED: Friday September 25

Time Ended: _____

DUE: Monday September 28

Topic : Solving First Order Linear Differential Equations

The learning goal of this quiz is to provide you with an example of actual exam questions and an opportunity to demonstrate your understanding of solution techniques of linear first order ODEs.

Reality Check: (1 point)

EXPECTED SCORE : _____/10

ACTUAL SCORE : _____/10

Instructions:

0. Please look for a hint on this quiz posted to <http://sites.oxy.edu/ron/math/340/15/>
1. Once you open the quiz, you have **30 minutes** to complete it, please record your start time and end time at the top of this sheet.
2. You may use the book or any of your class notes. **You must work alone.**
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one. **QUIZZES WITH UNSTAPLED SHEETS WILL NOT BE GRADED.**
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution. Use complete sentences wherever possible.
6. Relax and enjoy...
7. **This quiz is due at the beginning of class on Monday September 28**, in class. **NO LATE OR UNSTAPLED QUIZZES WILL BE ACCEPTED.**

Pledge: I, _____, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

Adapted from **Math 341 Fall 2008, Exam 1, Question 2.**

Determine whether the following statements TRUE or FALSE – put your answer in the box. To receive ANY credit, you must also give a brief, and correct, explanation in support of your answer! For example, if you think the answer is **FALSE** providing a counterexample for which the statement is NOT TRUE is best. If you think the answer is **TRUE** you should prove why you think the statement is always true. Your explanation of your answer is worth TWO TIMES as much as the answer you put in the box.

(a) *3 points.* **TRUE or FALSE?** The initial value problem $y' + 2y = 3, y(0) = 1$ possesses the one-parameter family of solutions $y(x) = \frac{1}{2}(3 - Ce^{-2x})$.

(b) *3 points.* **TRUE or FALSE?** The linear first-order DE $y' + 2xy = 3x$ does not have a closed form solution because its integrating factor is $\mu = e^{x^2}$, which is a non-integrable function.

(c) *3 points.* **TRUE or FALSE?** The linear ordinary differential equation $\frac{dy}{dt} = 2 - y$ has solutions of the form $y_1(t) + y_2(t)$ where $y_1(t) = 2$ and $y_2(t) = Ae^{-t}$ where A is *any* real number.