

Quiz 1

Differential Equations

Name: _____

Friday January 21

Ron Buckmire

Time Begun: _____

Time Ended: _____

Topic : Introduction to Differential Equations

The idea behind this quiz is to provide you with an opportunity to illustrate your understanding of ordinary differential equations and the interval of definition.

Reality Check:

EXPECTED SCORE : _____/10

ACTUAL SCORE : _____/10

Instructions:

0. Please look for a hint on this quiz posted to blackboard.oxy.edu
1. Once you open the quiz, you have **30 minutes** to complete, 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.
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.
6. Relax and enjoy...
7. **This quiz is due on Monday January 24**, in class. **NO LATE 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.

1. Consider the differential equation

$$(2y - 2)y' = 2x - 1$$

(a) *1 point.* Fully classify this differential equation by **type**, **order** and **linearity**.

(b) *2 points.* Verify that the one-parameter family $y^2 - 2y = x^2 - x + c$ is an implicit solution of this differential equation.

(c) *2 points.* Find a member of the one-parameter family in part (a) that satisfies the initial condition $y(0) = 1$.

(d) *3 points.* Use your result in part (c) to find an *explicit* function $y = \phi(x)$ that satisfies $y(0) = 1$. Give the domain of this function ϕ .

(e) *2 points.* Is the explicit function $y = \phi(x)$ a *solution* of the given initial value problem? If so, give its interval of definition I . EXPLAIN YOUR ANSWER.