BONUS QUIZ 4   **Differential Equations**

Name: _____

Friday March 4
Ron Buckmire

Topic : Linear, n^{th} Order, Nonhomogeneous, Differential Equations

The idea behind this quiz is to provide you with an opportunity to illustrate your understanding of the **annihilator method** for solving n^{th}-order nonhomogeneous ordinary differential equations.

Reality Check:

EXPECTED SCORE : _____/**10**   ACTUAL SCORE : _____/**10**

Instructions:

1. Please look for a hint on this quiz posted in the News section of `http://faculty.oxy.edu/ron/math/341`

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 March 7**, in class. NO LATE QUIZZES WILL BE AC-CEPTED.

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 linear third-order differential equation $Ly = g$,

$$\frac{d^3y}{dx^3} - y = e^x + 7$$

(a) *1 point.* Write down the linear operator L using differential operators

(b) *1 point.* Write down an annihilator operator N for the right-hand side $g(x) = e^x + 7$.

(c) *3 points.* Combine your answers in (a) and (b) to obtain the complete general solution of the differential equation. (Think about how many unknown constants this solution should have.)

(d) *4 points.* Find the solution which satisfied $y(0) = 1$, $y'(0) = 0$ and $y''(0) = 0$