MATH 361 EXAM 2, Fall 2011

Simplify all answers. Show your work!

Name:

Score	
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1. a) Solve: $y'' + 6y' + 9y = 0$.

   Ans:_____.

   b) Solve: $y'' + 4y' + y = 0$.

   Ans:_____.

2. Let $L(y) = y'' + p(t)y' + q(t)y = 0$. Prove Abel's formula for the Wronskian, $W = c\exp[-\int p(t)dt]$
   Hint: Compute $y_1L(y_2) - y_2L(y_1)$.

3. Let $L(y) = y'' + 36y$.

   a) Solve: $L(y) = 0$.

   Ans:_____.

   b) Solve: $L(y) = 0$; $y(0) = 5$, $y'(0) = 0$

   Ans:_____.

4. a) Write in the form $a + ib$: 2^{3+5i}.

   Ans:_____.

   b) Test for *l. i.*: $y_1 = e^{2t}$; $y_2 = te^{2t}$

   Ans:_____.

5. Find the Wronskian of two *l. i.* solutions of the equations:

   a) $ty'' + 2y + te^t y = 0$

   Ans:_____.

   b) $(1 - t^2)y'' - 2ty' + \alpha(\alpha + 1)y = 0$

   Ans:_____.

Extra space

Part II.	Name:

6. Use undetermined coefficients to find the particular solution of $y'' - 3y' - 4y = 10e^{-t}$.

Ans:_____.

7. Write a suitable undetermined coefficient form for the particular solution of:

a) $y'' - 16y = 3t + (5t + 1)e^{4t}$.

Ans:_____.

b) $y'' + 2y' + 5y = 5te^{-t}\cos 2t$

Ans:_____.

8. Let $t^2y'' + ty' - y = 72t^3$. It is given that $y_1 = t$ is a solution of the homogeneous equation.

a) Find a the second fundamental solution y_2 and the Wronskian.

Ans:_____.

b) Use variation of parameters to find y_p.

Ans:_____.

Extra space