Student Name: Section 208, Time:

MATH 10A – Fall 2018

Quiz 9 – Prepared by John Yirong Zhen

Date:10/23/2018

You are to finish this quiz in 10 minutes. You are allowed one single-sided letter-size cheat sheet. No calculators or other notes/books/devices are allowed.
Your cheatsheet must be handwritten by you, no photocopying or preprinted (unless you have written permission from the instructor). Try your best! Stay calm and good luck!

I. True/False (2 pts)

Circle T or F in the space provided in front of the statement to indicate whether it is true or false respectively. You get +1 for a correct answer, −1 for incorrect, and 0 for leaving it blank. (You should not guess if you don't know the answer.)
You do not need to justify your answers for T/F statements.

- Ⓣ F If functions f and g are solutions to the linear homogeneous differential equation $t^2y''' + e^ty'' + ty' + y = 0$, then any linear combination of f and g are also solutions the the same differential equation.
- T Ⓕ $3^{1+i} = 3^1(\cos 1 + i \sin 1)$

II. Written problems (10pts)

- You MUST **justify your answer** to undoubtably convince me that you solved and not guessed it. Partial credit will be given to good work and progress even if there is no final answer or the answer is incorrect. On the other hand, bogus justification for a correct answer will receive a 0.
- Keep your scratch work separate. Cross out writing you don't want to be graded and clearly label the parts you want to be graded.
- Points will be deducted for incorrect writings that you "forget to cross out."

See problem on back.

Find the solution to the following three DEs $y'' + 2y' + 1y = 0$, $y'' + 2y' - 3y = 0$ and $y'' + 2y' + 2y = 0$.

For the first DE, the characteristic polynomial are $r^2 + 2r + 1 = 0$, then $r = -1$. Therefore, the general solution is $y = (C_1 t + C_2)e^{-t}$.
For the second DE, the characteristic polynomial are $r^2 + 2r - 3 = 0$, then $r = -3, 1$. Therefore, the general solution is $y = C_1 e^{t} + C_2 e^{-3t}$.
For the third DE, the characteristic polynomial are $r^2 + 2r + 2 = 0$, then $r = -1 \pm i$. Therefore, the general solution is $y = e^{-t}(\sin t + \cos t)$.