Math 2C03: Assignment #5
Due: Friday, July 31st

McMaster University

Part I: Online

The online portion of your assignment is available on WeBWork.

Part II: Written

Please deposit the written part of this assignment in the course locker (basement of HH) by 2pm on the due date.

If you are unable to make it to campus, I will accept online submissions: either TeX your assignment OR *scan* your handwritten assignment. (Please do not take a photo, because it will be too difficult to read). Submit your file as a PDF via email, making the title your LastName_FirstName_Assignment5.

Questions:

Answer each question fully, explaining all reasoning.

1. (3*pts*) Evaluate the improper integral $\int_0^\infty t^2 e^{-4t} \cos(2t)\, dt$ using the Laplace transform.

2. (a) (3*pts*) Solve the system of differential equations
$$x' + x + 4y = 10$$
$$x - y' - y = 0$$
$$x(0) = 4, y(0) = 3, \text{ where } x \text{ and } y \text{ are functions of } t.$$

   (b) (2*pts*) Describe the behaviour of the solution as $t \to \infty$.

3. (2*pts*) What were three of the most important discoveries or realizations you made in this class? In other words, what are you taking away from this class that you think might stick with you and/or influence you in the future? These can include things you had not realized about mathematics, specific homework problems or theorems, discussions with other students or the instructor, connections to other courses, etc. Explain why these three discoveries or realizations are important to you.