

Final Exam
Mate 3048
Spring 2011



Name:

Student Number:

Instructions: Solve all problems. Even though group discussions are encouraged, the work you present here has to be **your own**. This work due Saturday, May 28th at 6:45 PM, at Monzón 311. Not electronic submissions will be allowed. No other students can handle in your work. Fail to accomplish this requirements will render an F on this work.

1. Solve the following:

a. $\frac{dy}{dx} = \frac{x^4 + 2y}{x}$

b. $\frac{dy}{dx} = \frac{2xy}{y^2 - x^2}$

c. $y'' + y' - 2y = 4x^2 - 10x + 1$

2. Find the curves that hit the circles $x^2 + y^2 = c$ in 45 degrees angles.

3. A body falls from rest subject to gravity in a medium offering resistance proportional to the Square of the velocity. Find expressions for velocity and distance.

4. Prove that: $(e^{at} f) * (e^{at} g) = e^{at} (f * g)$

5. Find information about Heun's Method for approximate numerical solutions. Compare, Euler's Method, Runge Kutta Method and Heun's method to

approximate $\frac{\pi}{3}$. You must mention differences in performance, precision and error analysis.