

MATH 271, HOMEWORK 1
DUE SEPTEMBER 6TH

Problem 1. Look up how to do *integration by parts*. Use this technique to compute the integral

$$\int t e^{3t} dt.$$

Problem 2. Convert the following numbers in Cartesian coordinates to polar coordinates and compute all pairwise products.

(a) $z_1 = \frac{1}{2} - \frac{1}{2}i$;

(b) $z_2 = -1 + 3i$;

(c) $z_3 = -2 - 3i$.

Problem 3. Find the square roots of $-i$ using a geometrical argument.

Problem 4. Draw the unit circle in the complex plane. Plot the complex numbers z_1 , z_2 , and z_3 given above and find their inverses. Explain what taking the inverse does geometrically.

Problem 5. Look up a differential equation in chemistry that interests you. Write it down, and explain what it attempts to model.

Problem 6. What is a differential equation? What does it mean for a function to be a solution to a differential equation?