

MA211: Assignment # 3

Required Reading.

- §17.1-17.2
- §3.1.1-3.1.3

Quiz on Sept. 26th. Any problems marked with * require the use of maple. All other problems are to be done by hand. Any problems marked with # can be submitted for review by the grader.

1. Textbook: §17.1: 16, 20#, 26#, 39#
2. Textbook: §17.2: 12, 15, 24#, 33#, 35 (In problems 21-36 you must use Euler's formula and the methods shown in class. Do not use the textbook's formulae or other methods.)
3. Textbook: §3.1: 4#, 14, 20#, 22#, 25, 26#, 28#
4. Find the roots of $z^4 + 3iz = 0$ using the methods shown in class.
5. *# Consider the linear differential equation $y''(x) - xy(x) = 0$, which arises in quantum mechanics.
 - (a) Use Maple's *dsolve* to compute the general solution. The special functions you see are known as Airy functions. Plot the two Airy functions on the same axis with the domain $x \in [-20, 10]$ and range $y \in [-1, 2]$.
 - (b) Compute the 2×2 Wronskian, using Maple to help you compute derivatives of the Airy functions. Because the Wronskian you found doesn't simplify to something you can easily understand, make a *good* plot of it to show that the two Airy functions are probably linearly independent.