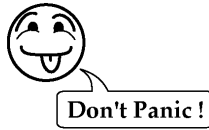


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Mathematical Methods I
Double Quizz

1st Nov. '96.

Instructor: T. Hübsch

(Student name and ID)

This is an “open Textbook (Arfken), open lecture notes” double quizz. For full credit, show all your work. If you cannot complete one part of a calculation, a clear description of the procedure/method will still earn you partial credit. Budget your time: first do what you are sure you know how; use short-cuts whenever possible (but be prepared to explain them afterwards, if necessary).

1. Prove that all complex numbers have square roots, and which in turn are again complex numbers. [=5pt]

(Hint: use polar (Moivre) representation.)

2. Determine whether the following complex functions are analytic, i.e., have a unique derivative. To that end, first determine the real and imaginary part of each function and then check the Cauchy-Riemann conditions.

a. $f(z) = z^2 + z^3$; [=5pt]

b. $g(z) = z\bar{z} + z^3$; [=5pt]

c. $h(z) = e^{iz}$. [=5pt]

Homework, due November 11th: 6.1.6 (use $z = re^{i\theta}$), 6.1.7, 6.1.10, 6.1.18, 6.2.5, 6.2.8, 6.3.3, 6.3.4, 6.4.2, 6.4.4, 6.4.8, 6.5.11, 6.6.4.