Norwegian University of Science and Technology
Department of Mathematical Sciences

TMA4115, Spring 2013, Test 1

Exercise group number:

Name:

NTNU username:_____@stud.ntnu.no

You have 20 minutes to solve the 4 problems. Each problem is worth 10 points, and you need at least 20 points to pass the test. Your answers must be written on this sheet of paper (you can use additional sheets if you need more space for your answers). You are allowed to use a Citizen SR-270X or Hewlett Packard HP30S calculator, and Rottman's "Matematisk formelsamling", but no books or notes.

Problem 1 Let z be the complex number z with $|z| = 2\sqrt{3}$ and $\arg(z) = \frac{-2\pi}{3}$. Write z in the form $z = x + yi$.

Problem 2 Describe geometrically or make a sketch of the set of points z in the complex plane satisfying $1 < |z| < 2$ and $\frac{\pi}{4} \leq \arg(z) \leq \frac{3\pi}{4}$.

Problem 3 Simplify the expression $\dfrac{-2+i}{2+3i}$.

Problem 4 Find the modulus and arguments of all 3 complex solutions of the equation $z^3 + 1 + i = 0$.