Assignment 2
Due date : September 16, 2013

Total points = 10
Penalty for submitting on September 17 : -1
Penalty for submitting on September 19 : -2
Assignments won't be accepted after September 19.

1. Let $\Gamma^r_{(a,b)}$ denote the circle with centre (a, b) and radius r. $S^r_{(a,b)}$ be the circular inversion along $\Gamma^r_{(a,b)}$. Also we fix the symbols for the following operations:

$T_{(a,b)}$	Translation by the vector (a, b),
Σ_r	Scaling by r; $(x, y) \mapsto (rx, ry)$.

Prove that $S^r_{(a,b)} = T_{(a,b)} \circ \Sigma_r \circ S^1_{(0,0)} \circ \Sigma_{1/r} \circ T_{(-a,-b)}$.

2. Using the above exercise, write a formula for S^r_C where C is the complex number $C = a + ib$ as

$$S^r_C(Z) = \text{some complex expression in } C, Z \text{ and } r.$$

3. Complete the proof that circular inversion is conformal.

4. When is S^r_C of $\Gamma^1_{(0,0)}$ a straight line? When is it a circle? In the cases it is a circle, what is its centre and radius?