Quiz 2

Date : September 12, 2013,   Total time : 30 minutes, Total points : 20 points.

Name: _____   Reg.No.:_____

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1. Suppose $P \in \mathbb{R}^2$ and $\Gamma_P^{r_1}$ and $\Gamma_P^{r_2}$ are two circles with centre P and radii r_1 and r_2 respectively. Let $S_P^{r_1}$ and $S_P^{r_2}$ be the circular inversions along $\Gamma_P^{r_1}$ and $\Gamma_P^{r_2}$ respectively. Can you give a simple description of the composition map $S_P^{r_1} \circ S_P^{r_2}$?

12 points.

2. Is
$$\varphi(z) = \frac{1}{z}$$
a circular inversion? (That is, does there exist a point $P \in \mathbb{R}^2$ and a radius r such that $S_P^r = \varphi$?) Justify your answer.

4 points.

3. Is
$$\psi(z) = \frac{\bar{z}}{\bar{z} - 1}$$
a circular inversion? If so, what is the center P and radius r for which $S_P^r = \psi$?

4 points.