

Math 379 H3

Question 1. Consider the Möbius transformations

$$f_1 = \frac{a_1 z + b_1}{c_1 z + d_1}$$

and

$$f_2 = \frac{a_2 z + b_2}{c_2 z + d_2}.$$

Compute the explicit form of the transformations $f_1 \circ f_2$ and $f_2 \circ f_1$. How is the composition of Möbius transformations related to the multiplication of matrices

$$\begin{pmatrix} a_j & b_j \\ c_j & d_j \end{pmatrix}, \quad j = 1, 2 \quad ?$$

Question 2. p.44, problem 3.1

Question 3. p.44, problem 3.5

Question 4. p.44, problem 3.9

Question 5. p.44, problem 3.10 (there are some misprints in this question)

Question 6. p.45, problem 3.11

Question 7. p.45, problem 3.13

Question 8. Find the transformations of the complex plane generated by space reflections with respect to the x_1x_2 , x_2x_3 , x_3x_1 planes? Note: The reflection with respect to the x^1x^2 plane simply means that $x_1 \rightarrow x_1$, $x_2 \rightarrow x_2$, $x_3 \rightarrow -x_3$ etc. Specify which stereographic projection map you are using.