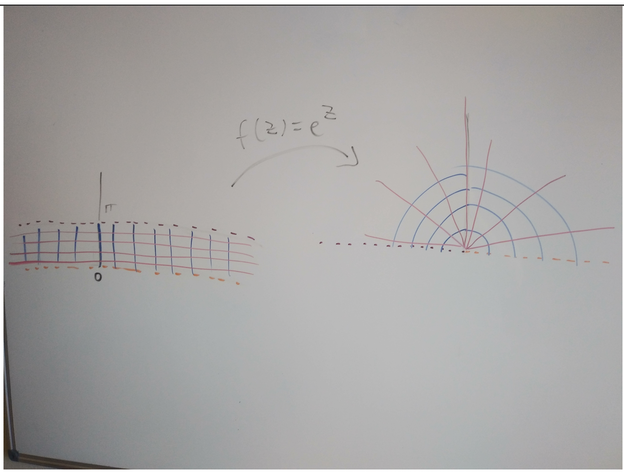
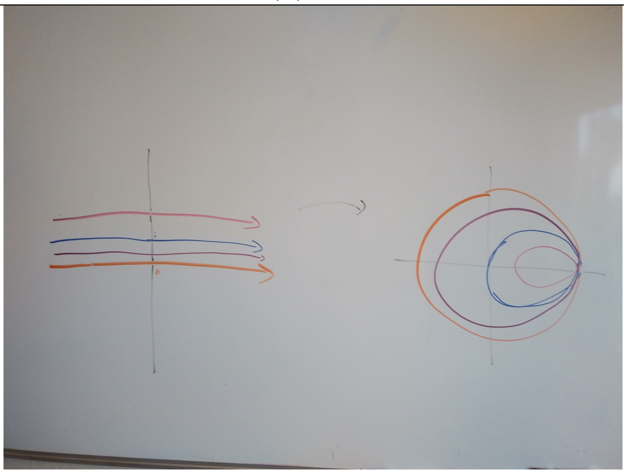
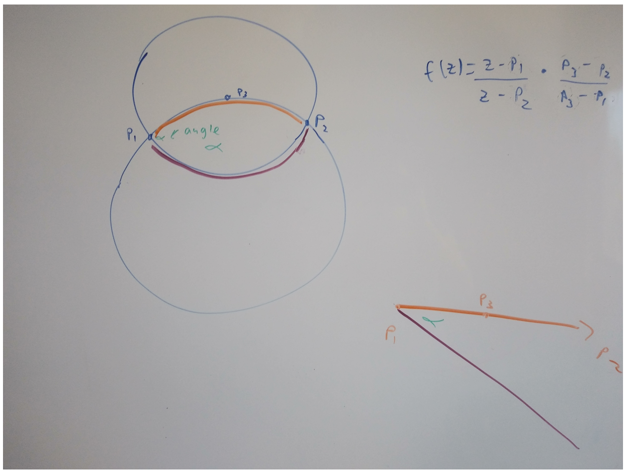
Mapping	**Uses**
$f(z) = z + b$	Translate by b
$f(z) = Rz$, $R > 0$	Scale by a factor of R
$f(z) = e^{i\theta}z$, θ real	Clockwise rotation by angle θ
$f(z) = z^a$	Maps the infinite sector $\{z\colon 0 < \arg(z) < \alpha\}$ to the infinite sector $\{z\colon 0 < \arg(z) < a\alpha\}$
 $f(z) = e^z$	Maps the infinite strip $\{z\colon 0 < \mathrm{Im}(z) < \pi\}$ to the upper half plane
 The Cayley transform: $f(z) = \frac{z-i}{z+i}$	Maps the upper half plane to the unit disk

Mapping	**Uses**
Fractional Linear transforms: $f(z) = \frac{az+b}{cz+d}$ Example with lunar domain: 	• Maps circles&lines to circles&lines • Maps lunar domains to sectors • Bijective on $\mathbb{C} \cup \{\infty\}$ • uniquely determined by 3 points: the LFT $$f(z) = \frac{z - z_0}{z - z_2} \frac{z_1 - z_2}{z_1 - z_0}$$ Maps $z_0 \to 0$, $z_1 \to 1$, $z_2 \to \infty$ • Mnemonic for inverse and multiplication from 2×2 matrices: mapping the matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ to the LFT $(az+b)/(cz+d)$ is a group homomorphism with the set of 2×2 invertible matrices
 $f(z) = z + 1/z$	Maps unit semicircle in upper half plane to the lower half plane
$f(z) = \lambda \frac{z-a}{1-\bar{a}z}, \quad \lvert a \rvert < 1, \quad \lvert \lambda \rvert = 1$	*Every* conformal self-map of the unit disk is of this form