

$$\oint_C (2z^{-1} + 5z^{-3} + \frac{1}{(z-2)^2}) dz,$$

where C is the path, which is defined by the circle $\{z \in C \mid |z - 2| = 1\}$ once into the positive direction (i.e. counterclockwise).

4. Etsi funktion $f(z) = \frac{1}{z^2-1}$; $z_0 = 1$ (eli kehityspiste on 1); Laurentin sarjaesitys, joka suppenee alueessa $\{z \in C \mid 0 < |z - 1| < R\}$ jollakin $R > 0$.

Find the Laurent series presentation for the function $f(z) = \frac{1}{z^2-1}$; $z_0 = 1$ (i.e. the basic point is 1), which converges in the area $\{z \in C \mid 0 < |z - 1| < R\}$ for some $R > 0$.

5. Muodosta Möbius-kuvaus, joka kuvaa reaaliakselin $\{z \in C \mid \operatorname{Im}(z) = 0\}$ imaginäriakselille $\{z \in C \mid \operatorname{Re}(z) = 0\}$.

Find the Möbius mapping that maps the real axis $\{z \in C \mid \operatorname{Im}(z) = 0\}$ into the imaginary axis $\{z \in C \mid \operatorname{Re}(z) = 0\}$.