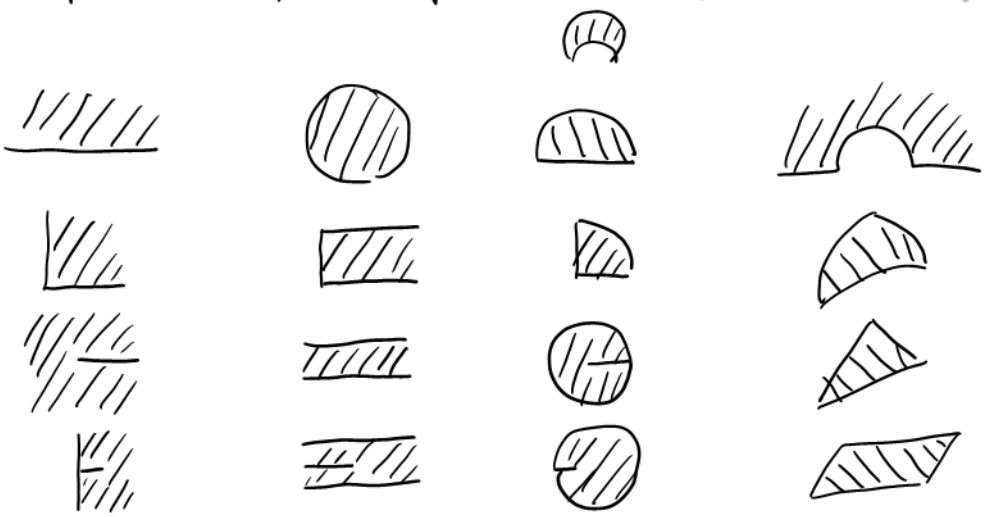
Modular form

0. small topics in complex analysis (prepared for Yilong Zhang)



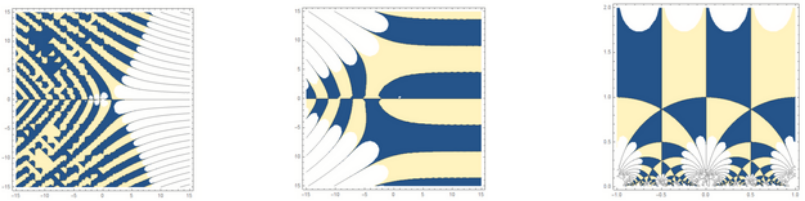
There are more examples in Ahlfors' book or Jihuai Shi's book, but I think it's enough for one-time show.

https://math.stackexchange.com/questions/585182/why-is-the-riemann-mapping-theorem-important

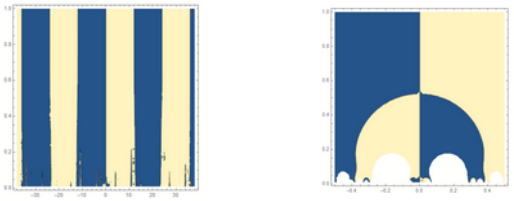
with sphere packing: https://scholarworks.calstate.edu/downloads/rn301358k
By 2.2.1, every simply connected proper open subset of C is not biholomorphic to C.

Liouville's theorem: every bounded entire function must be constant.
Cor1. For every entire function f, if Re f is bounded, then f is constant.
Cor2. For every entire function f, if f^{-1}([0,\infty]) is empty, then f is constant.
Cor3. For every entire function f, if f is injective, then f is surjective.

Little Picard Theorem is the strongest version of this type of results. For a statement, see wiki: Picard_theorem; for a proof, see [WWL, 例3.3.6].



$\Gamma(z)$ $\zeta(z)$ $j(z)$



$\tau(z)$

Some concrete biholomorphic functions in the Riemann mapping theorem give us arithmetical informations.