Tactile hyperbolic geometry

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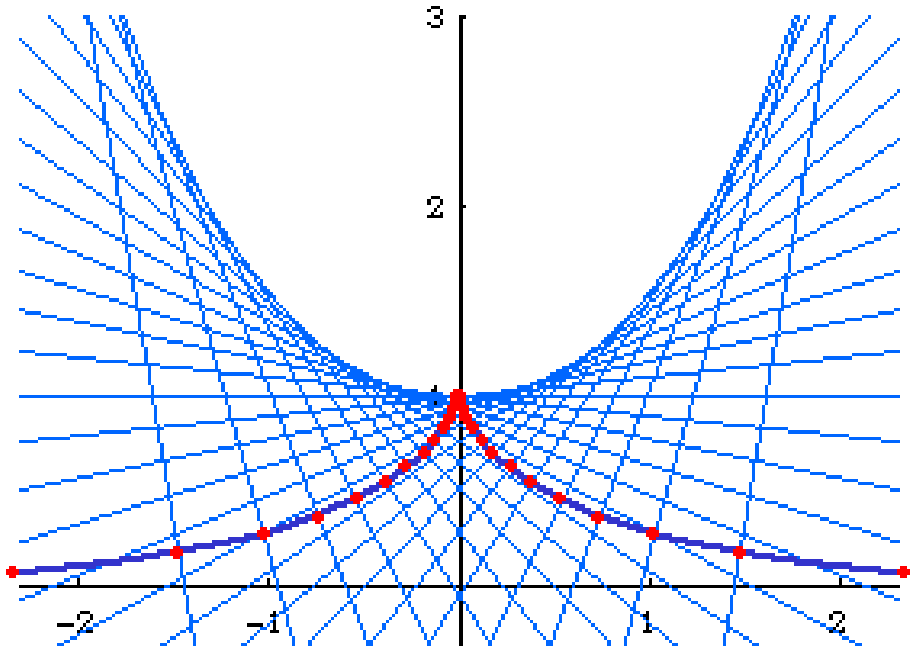
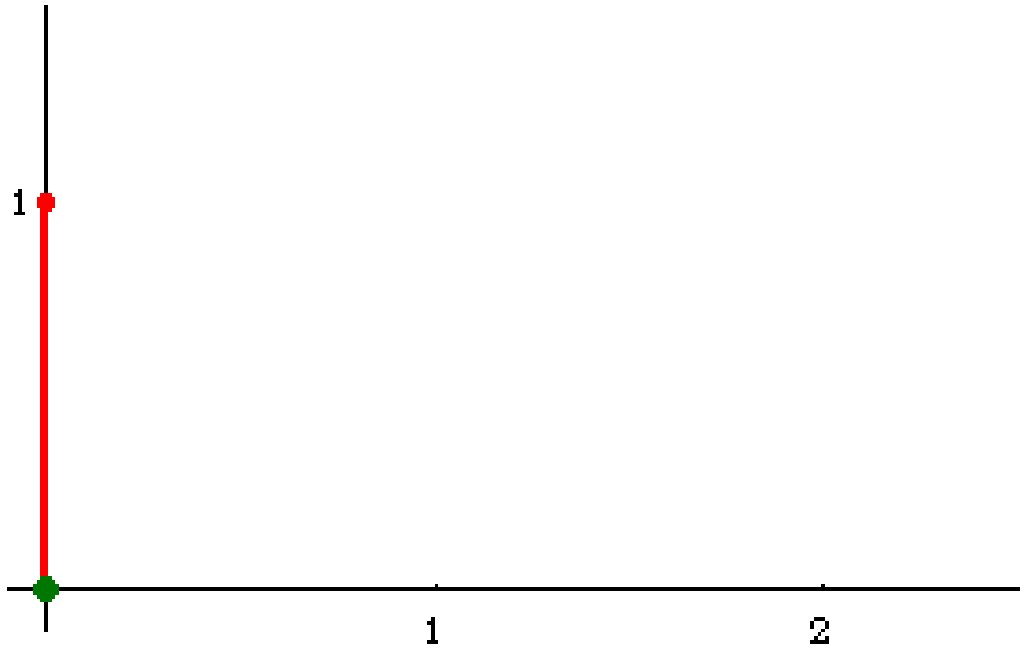
Tractrix

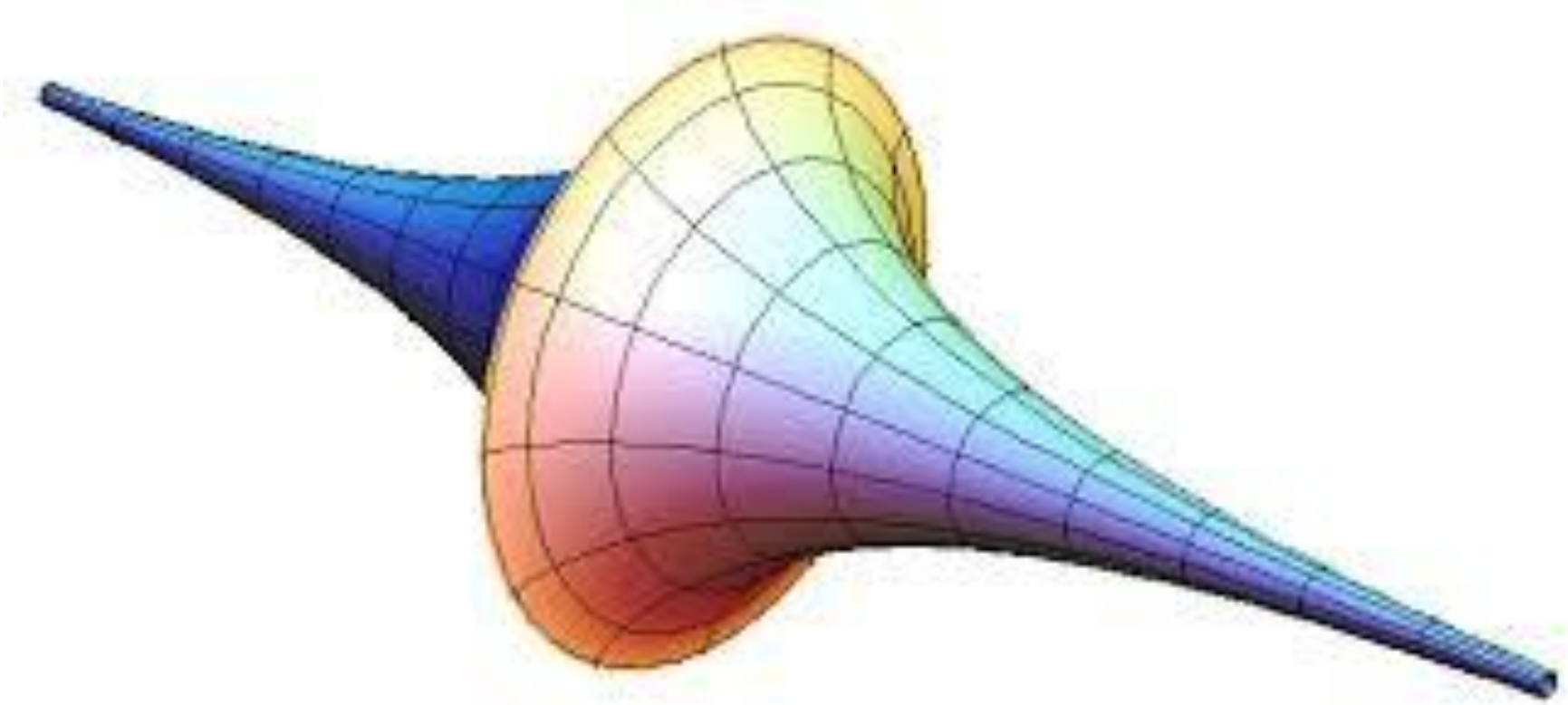
$$x = a\ln\left(\frac{a+\sqrt{a^2-y^2}}{y}\right)-\sqrt{a^2-y^2}$$

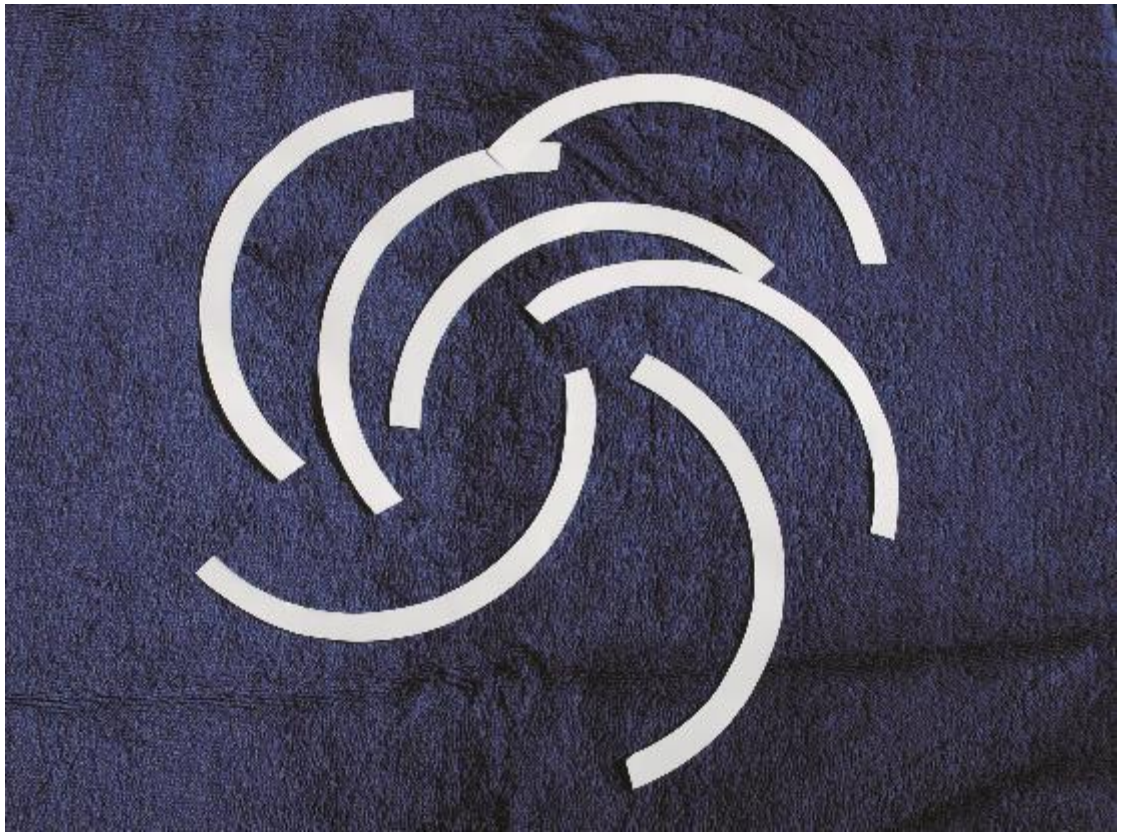


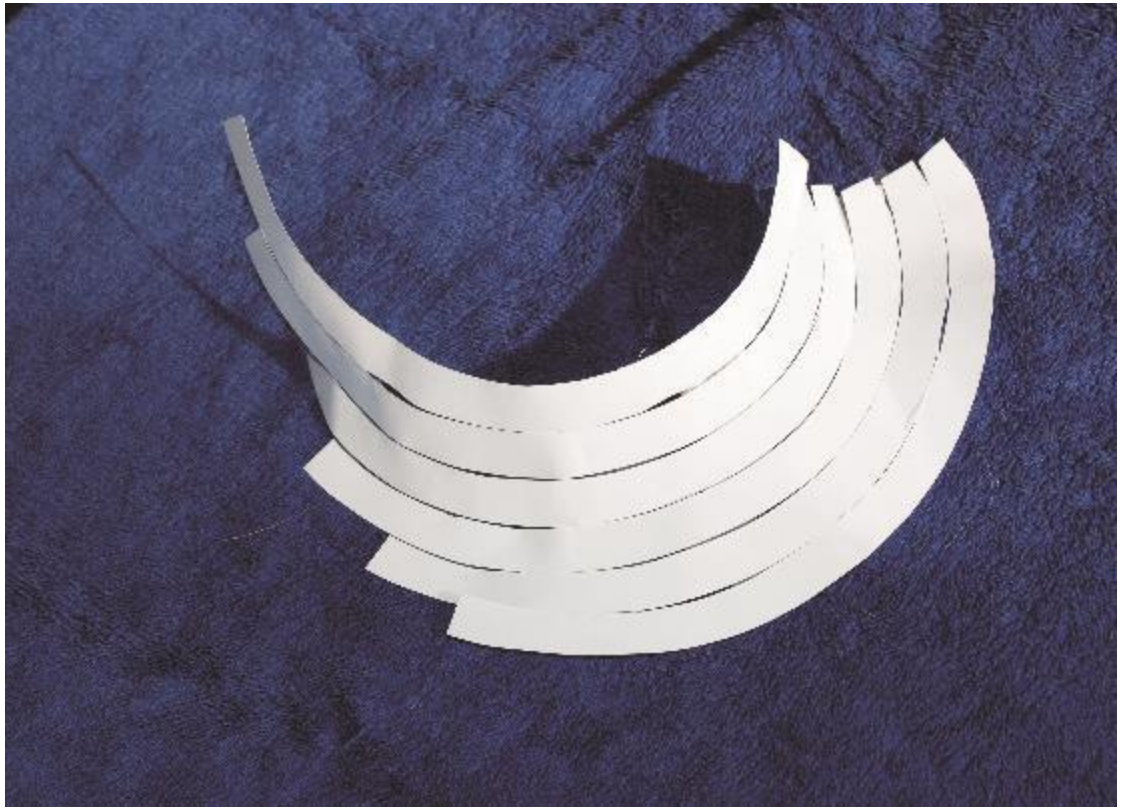


Pseudosphere

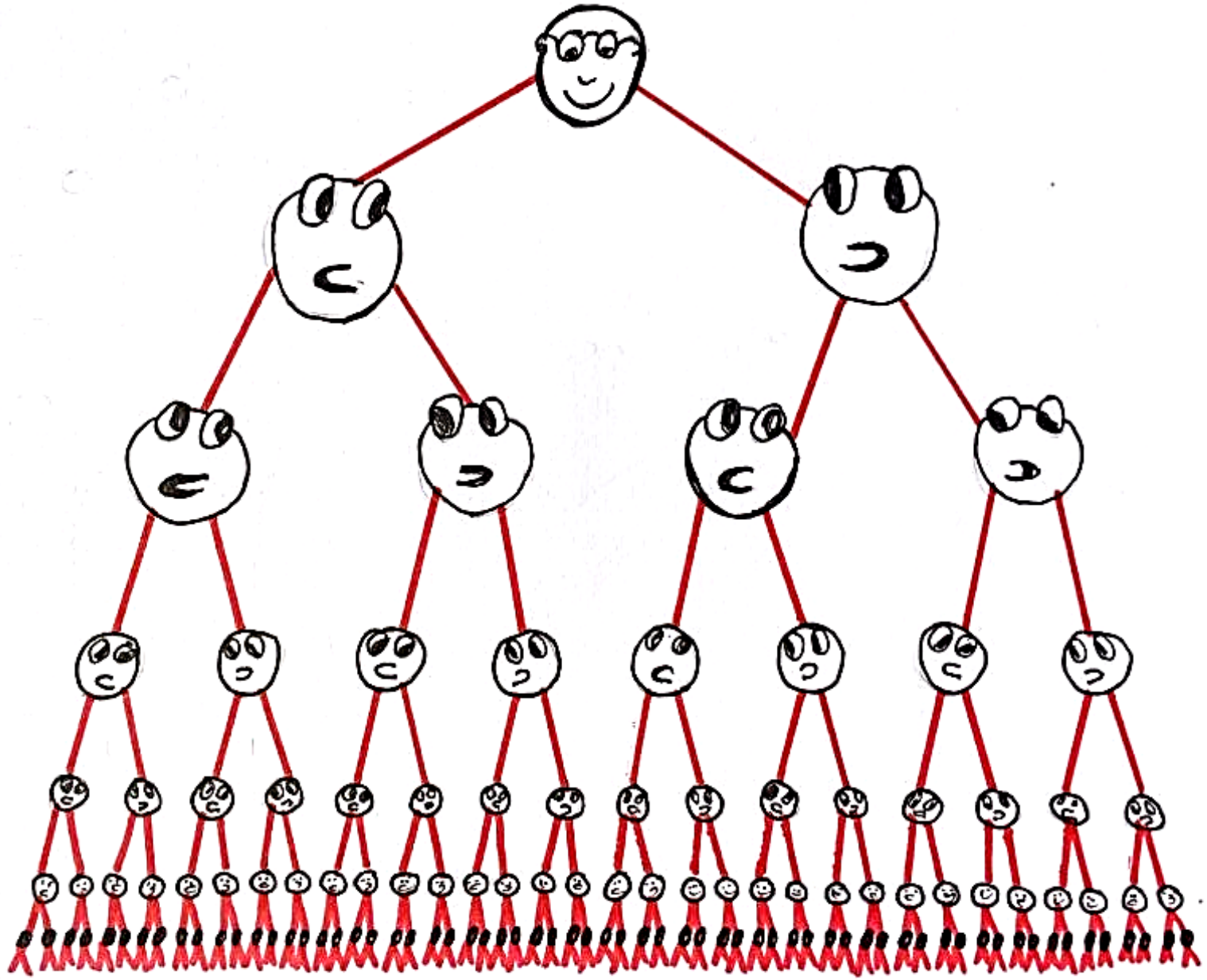
$$z^2 = \left[a \operatorname{sech}^{-1}\left(\sqrt{\frac{x^2+y^2}{a}} \right) - \sqrt{a^2 - x^2 - y^2} \right]^2.$$



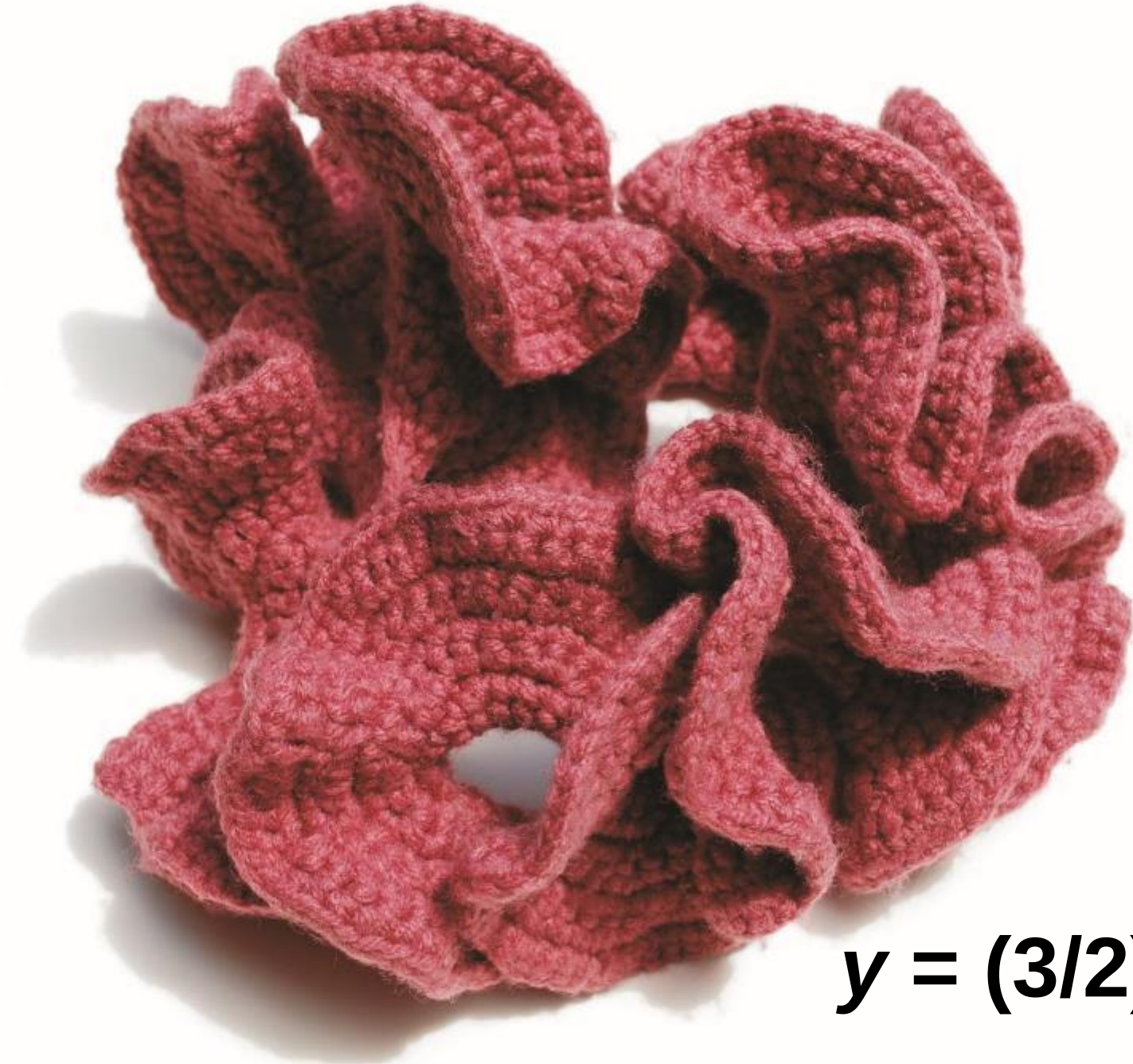




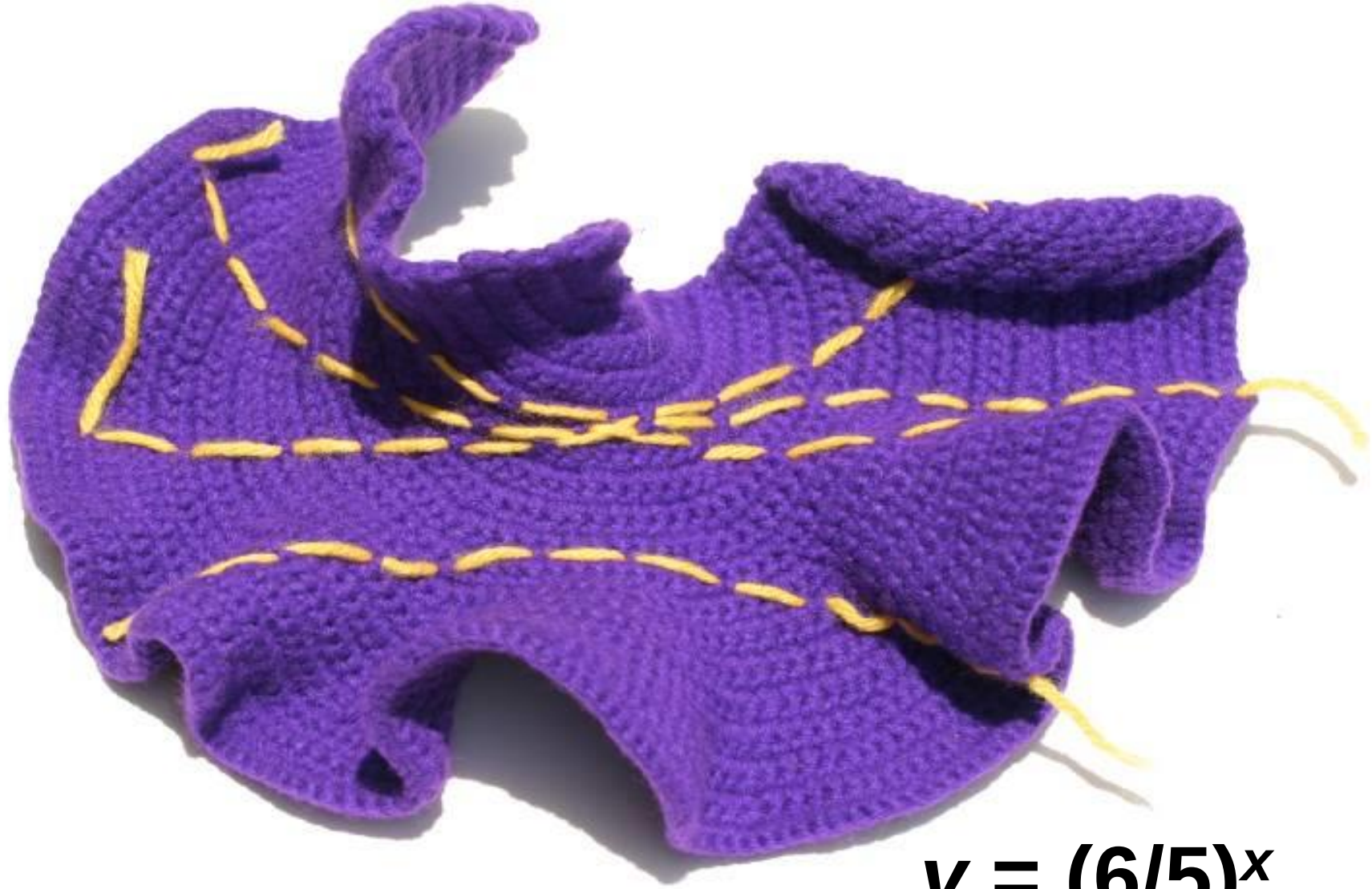
$y = 2^x$



1
2
4
8
16
32
64
128



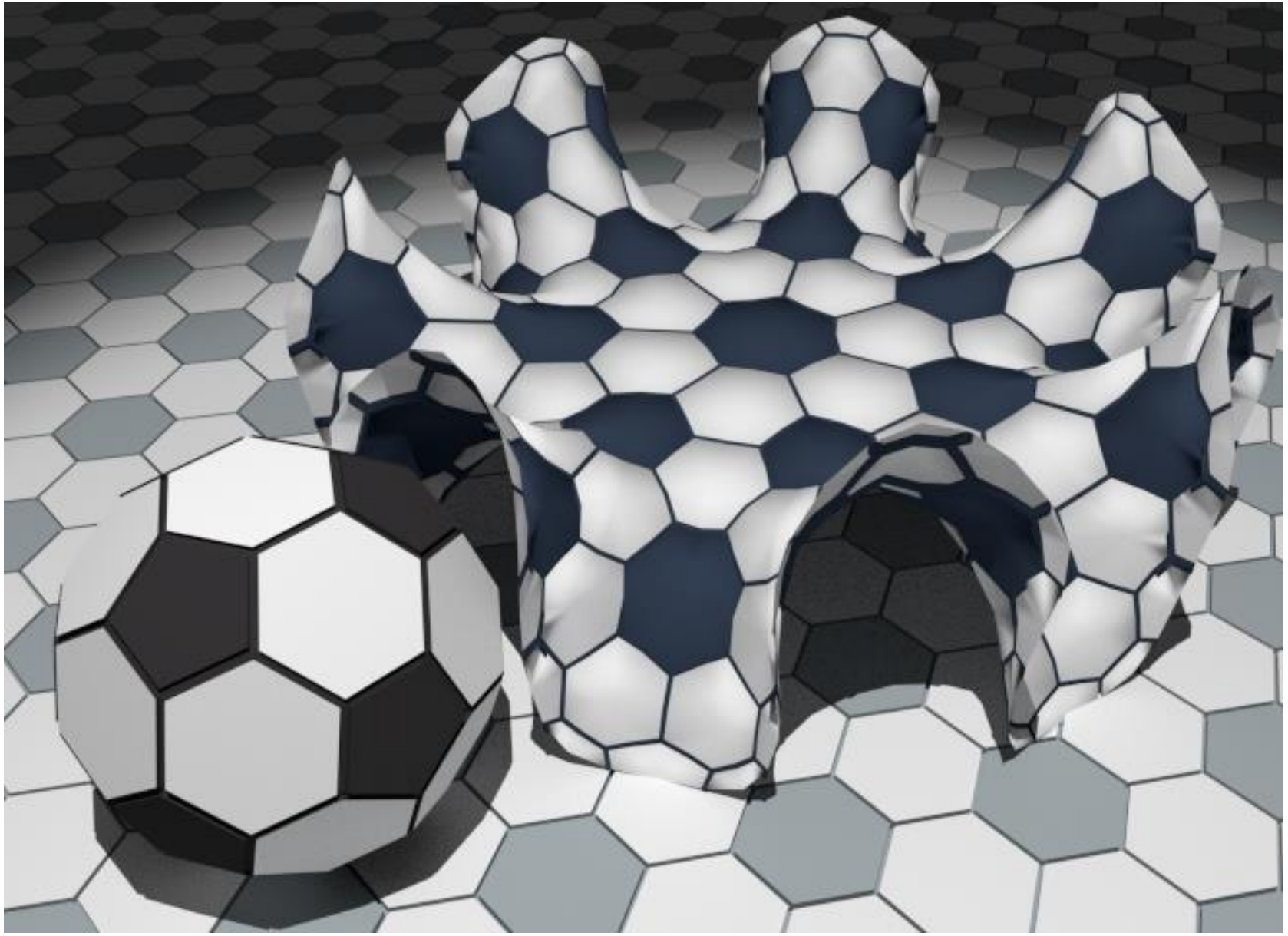
$y = (3/2)^x$



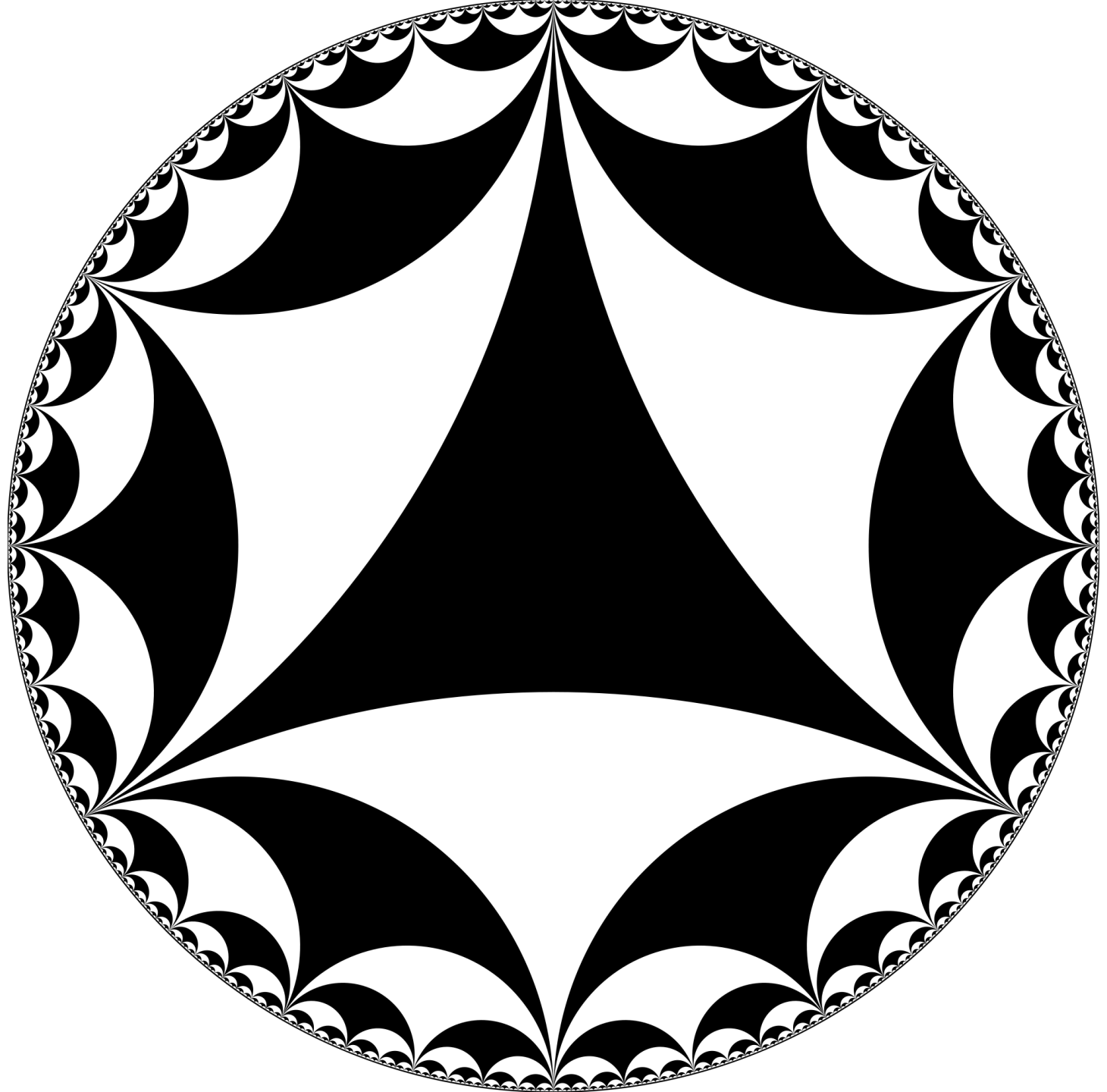
$y = (6/5)^x$

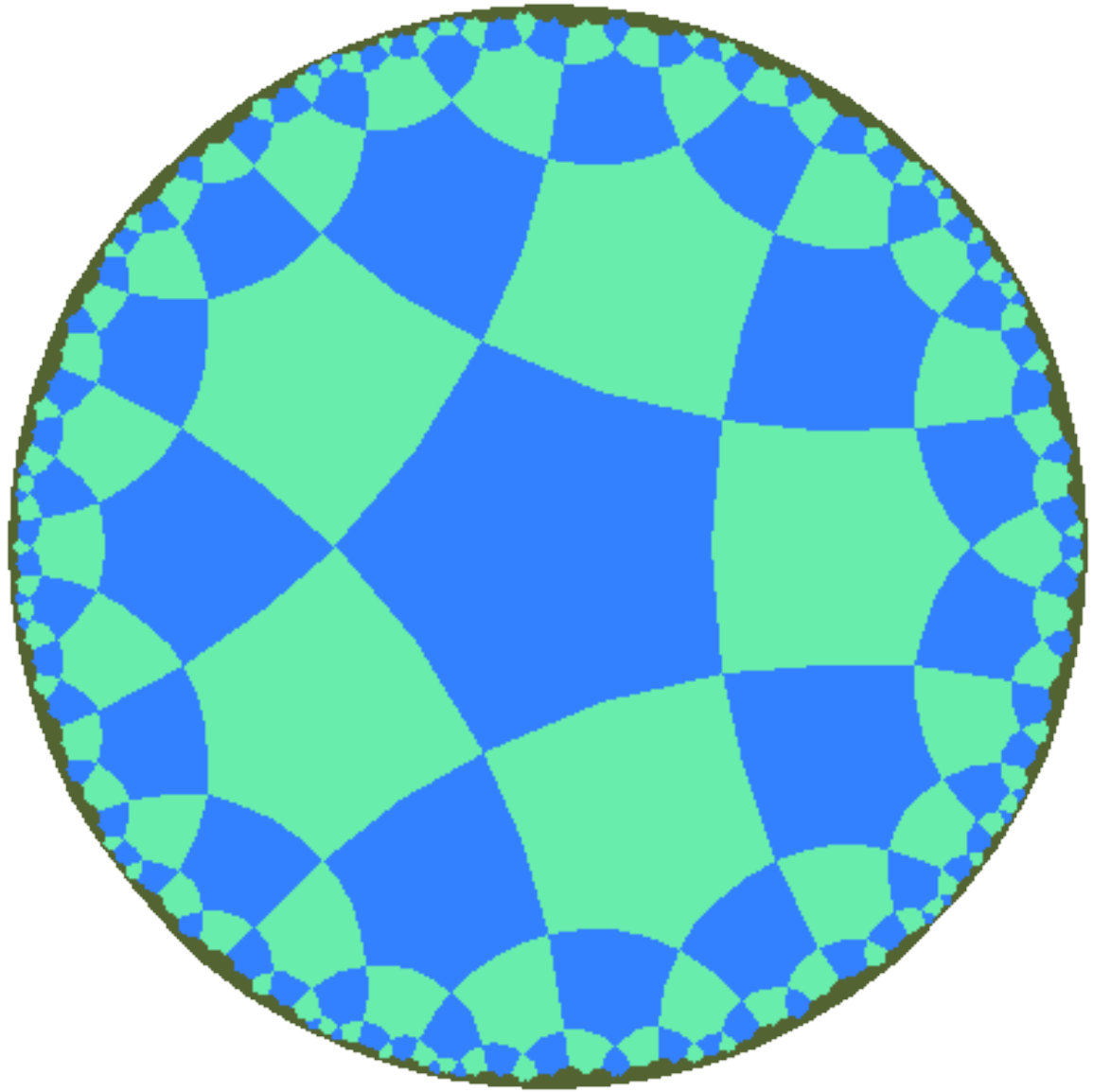
$y = (12/11)^x$


NORTH ATLANTIC
OCEAN
BRAZIL
SOUTH AMERICA
SOUTH ATLANTIC
OCEAN



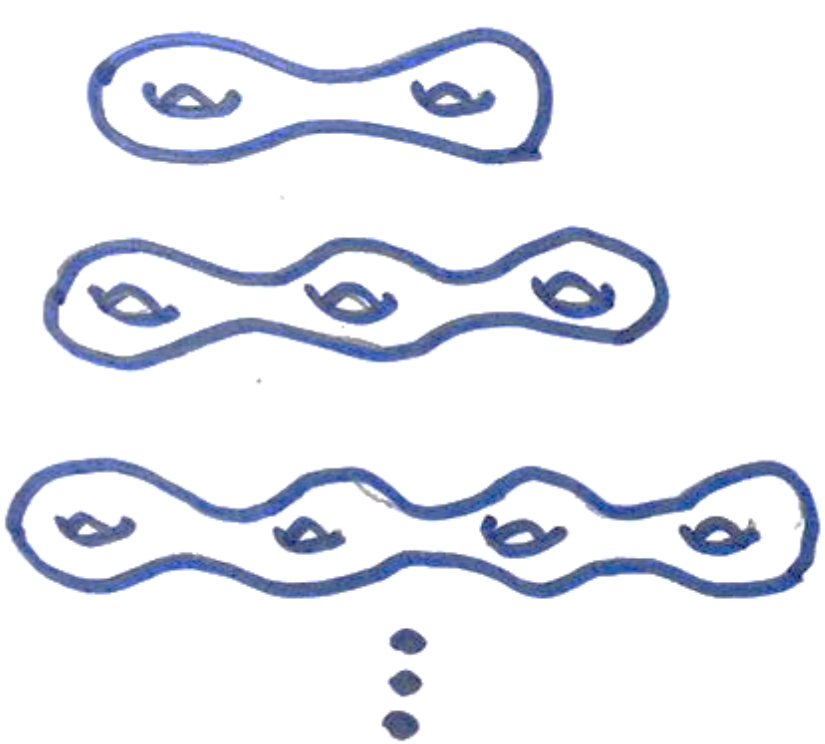
http://elfnor.com/hyperbolic-tiling-in-3d.html





Euclidean geometry

Spherical geometry



Hyperbolic geometry

45º

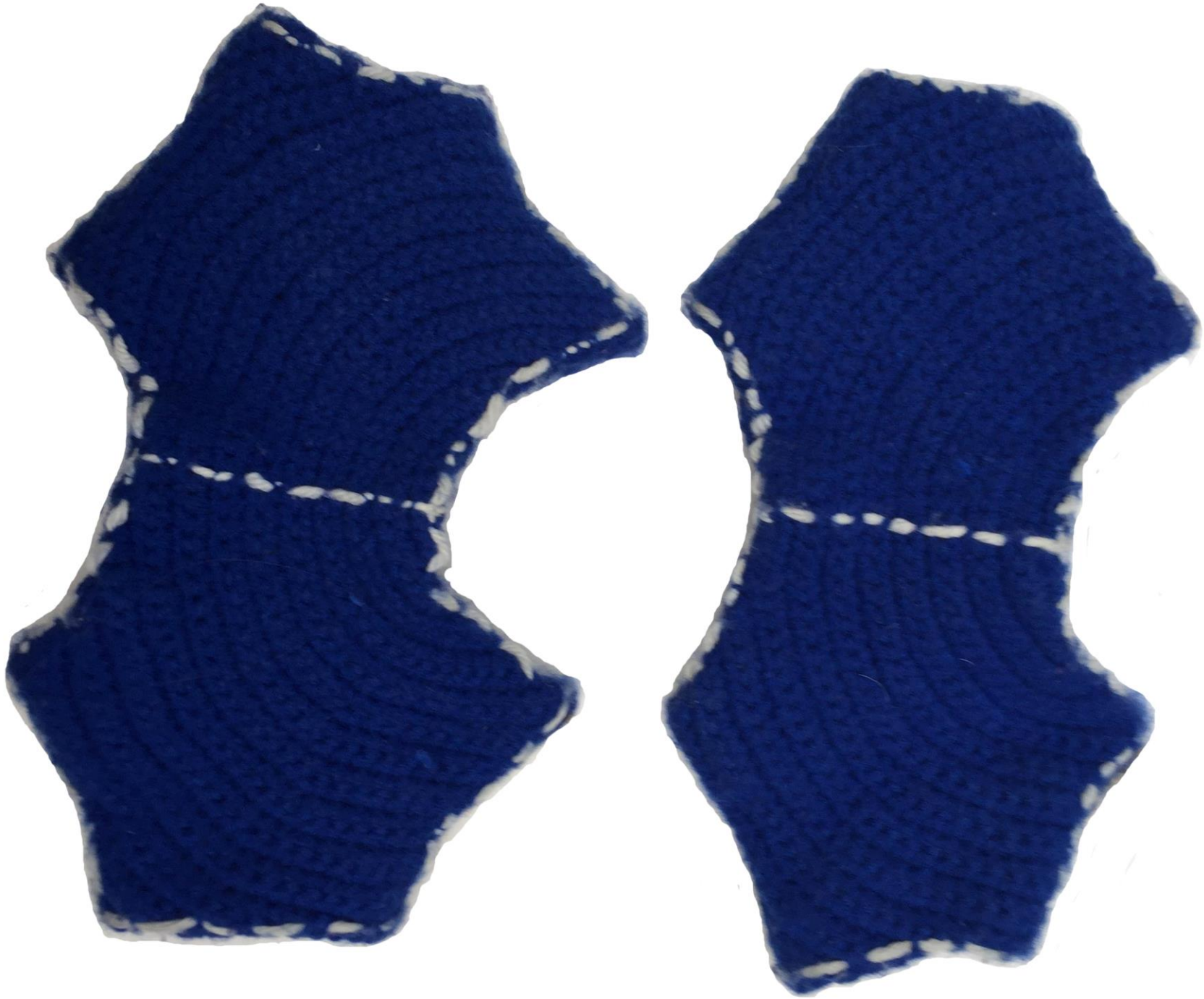
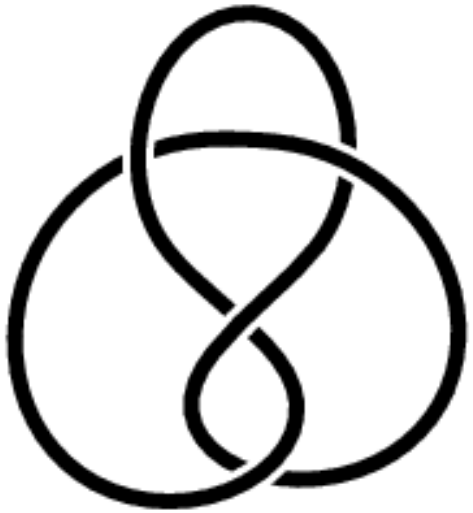
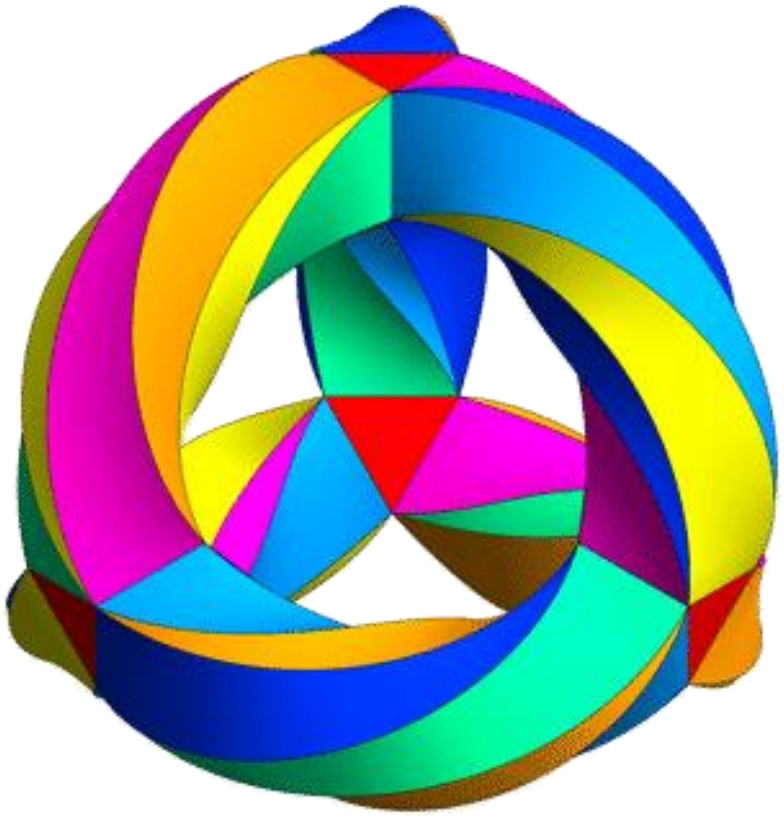


Figure Eight Knot



Klein Quartic $u^3v + v^3w + w^3u = 0$

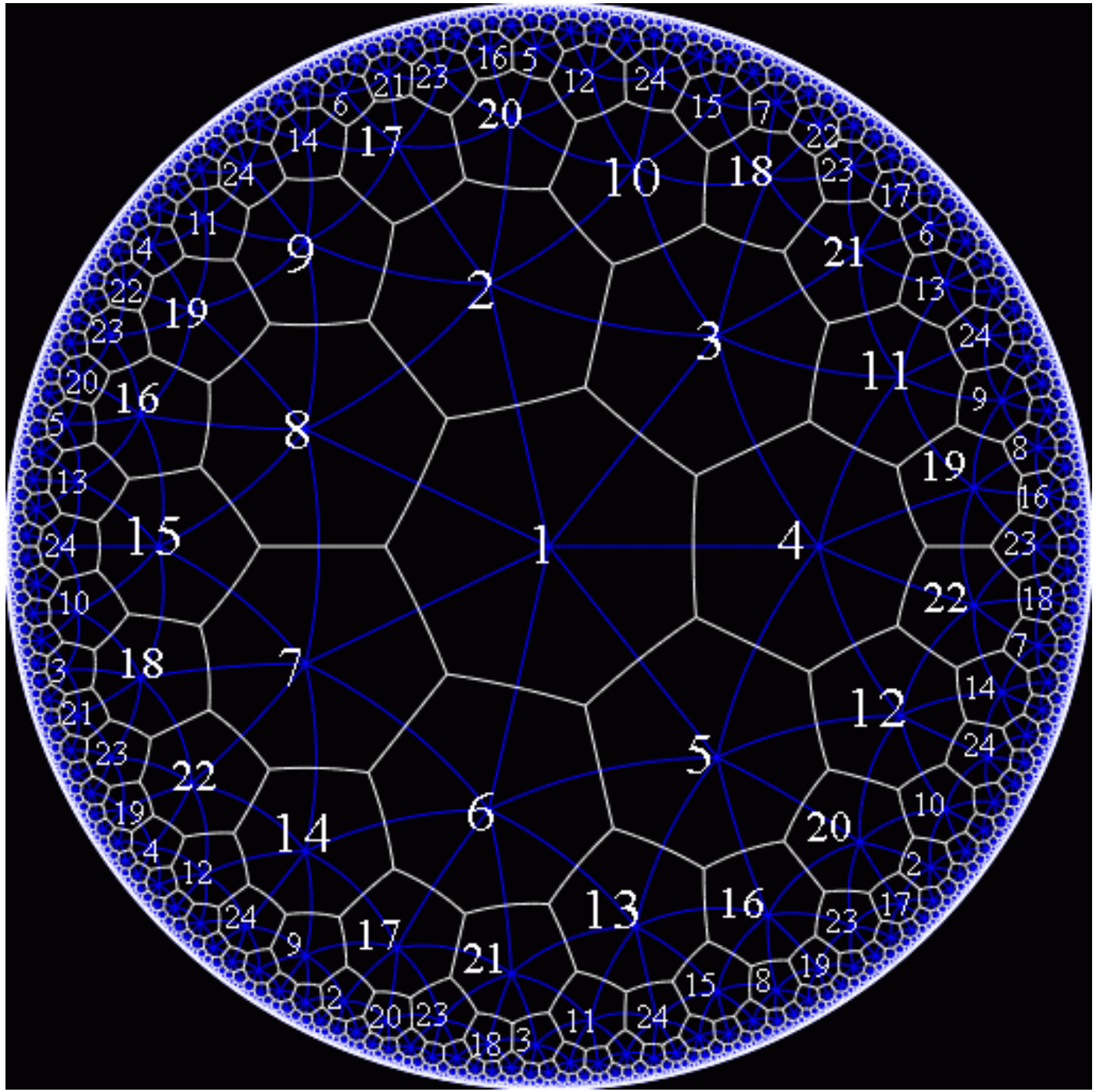


http://math.ucr.edu/home/baez/klein.html

Klein Quartic

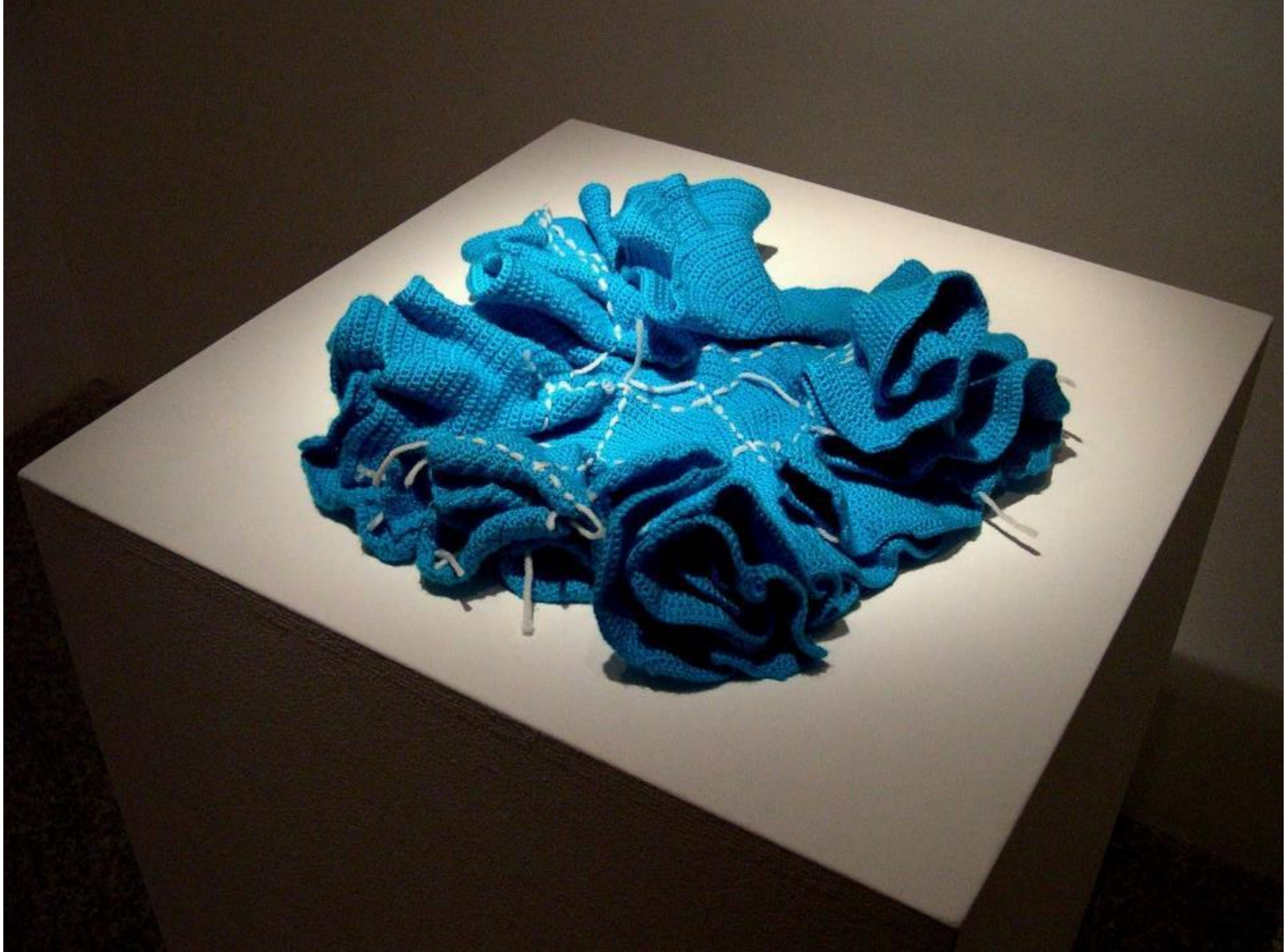
Henri Segerman

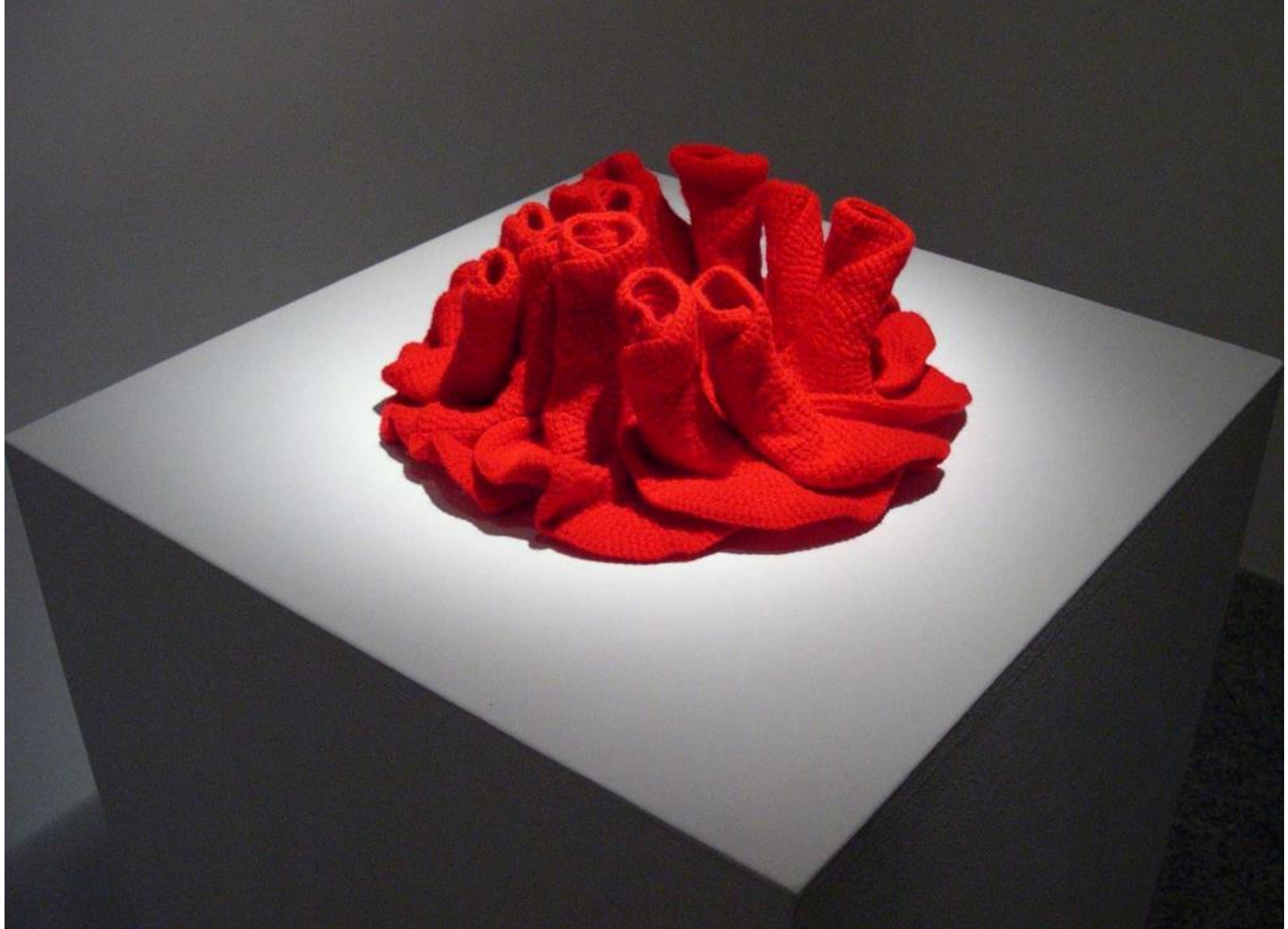
Evelyn Sequin,
pattern by Bill Thurston



20
8
12
8
16
3
22
3


Thank you!






Spherical
Hyperbolic
STOP
cannot bend without destroying geometry
2-hole torus
Try!
in 4th dimension

Helicoid

Catenoid

Pseudosphere as catenoid's canal surface