

“Farey Fractions”

Or, how
“adding tops and bottoms”
isn’t always such a bad thing.

List all fractions from 0 to 1,

in order of size,

in simplest form,

using no digit greater than n ,

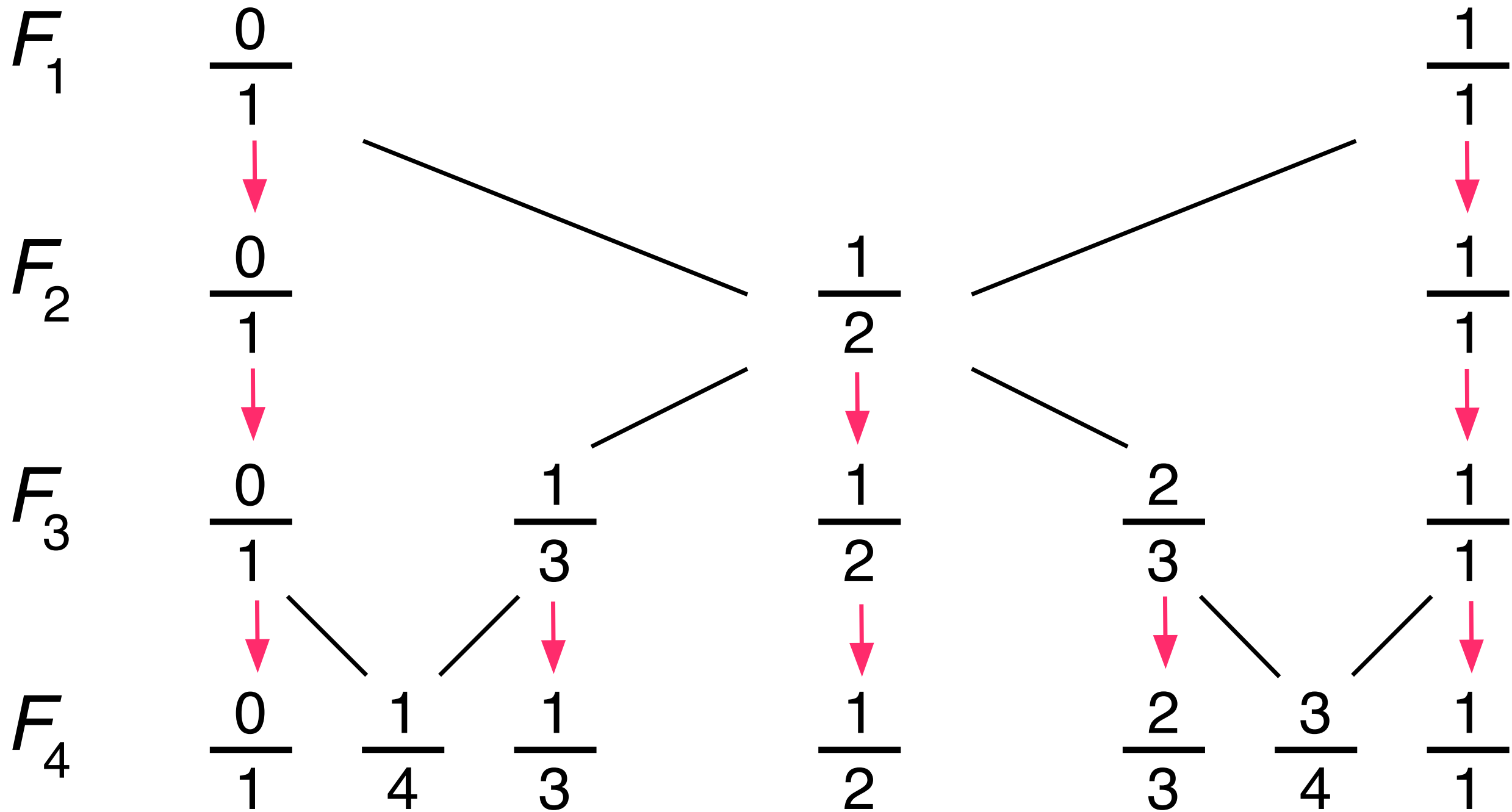
The resulting sequence is called
the Farey set F_n .

$$F_1 = \left\{ \frac{0}{1}; \frac{1}{1} \right\}$$

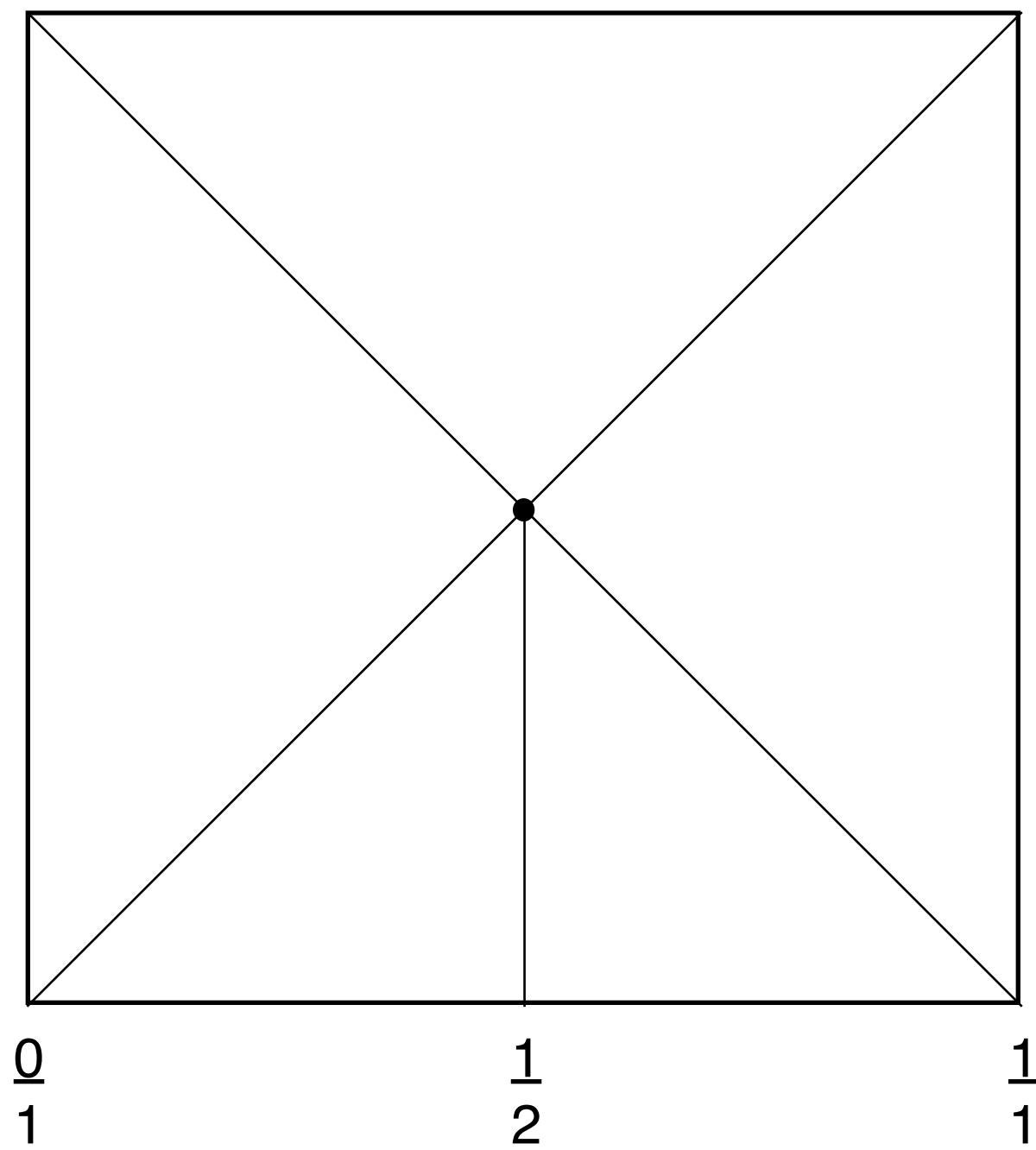
$$F_2 = \left\{ \frac{0}{1}; \frac{1}{2}; \frac{1}{1} \right\}$$

$$F_3 = \left\{ \frac{0}{1}; \frac{1}{3}; \frac{1}{2}; \frac{2}{3}; \frac{1}{1} \right\}$$

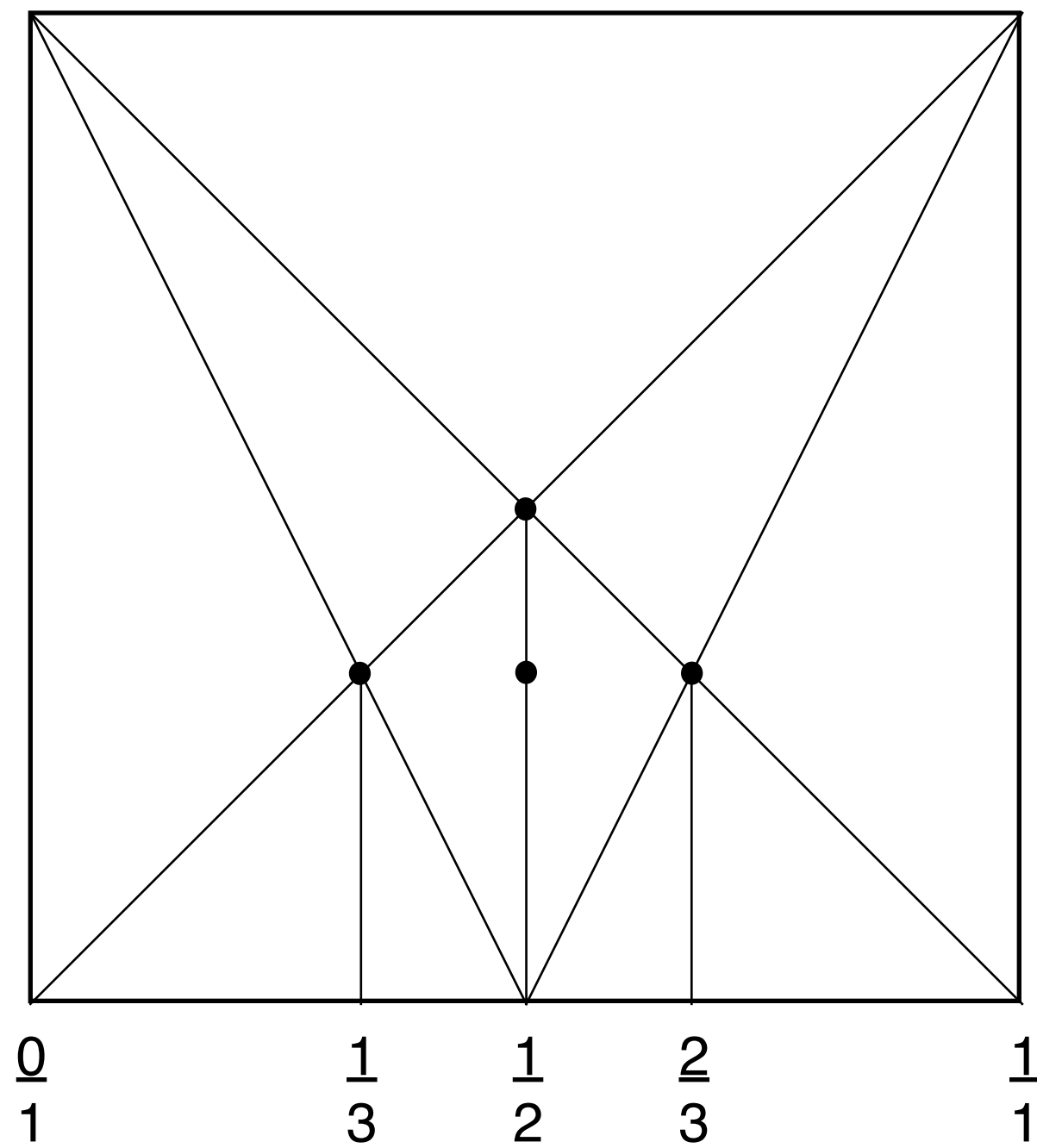
$$F_4 = \left\{ \frac{0}{1}; \frac{1}{4}; \frac{1}{3}; \frac{1}{2}; \frac{2}{3}; \frac{3}{4}; \frac{1}{1} \right\}$$



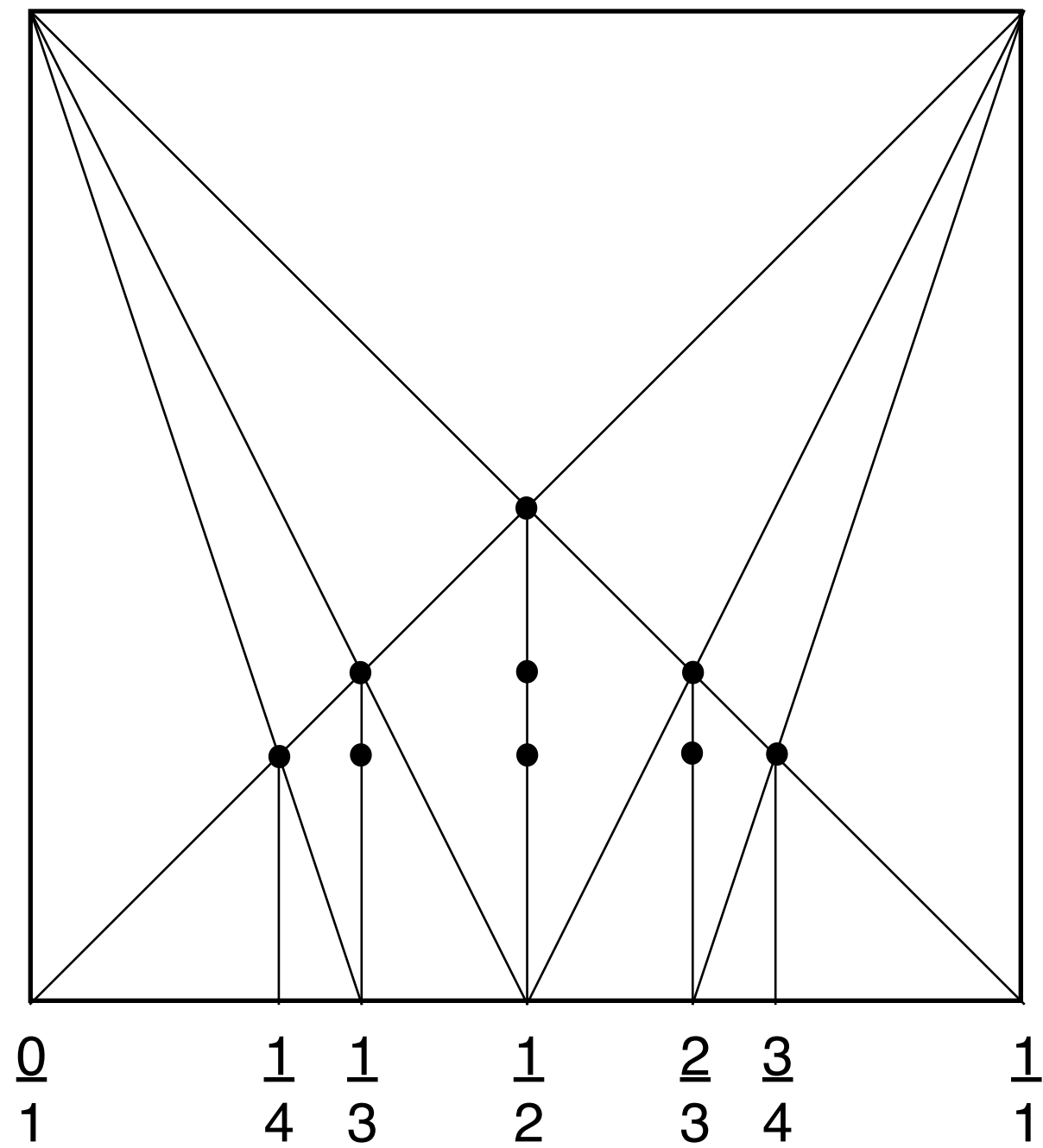
F₂



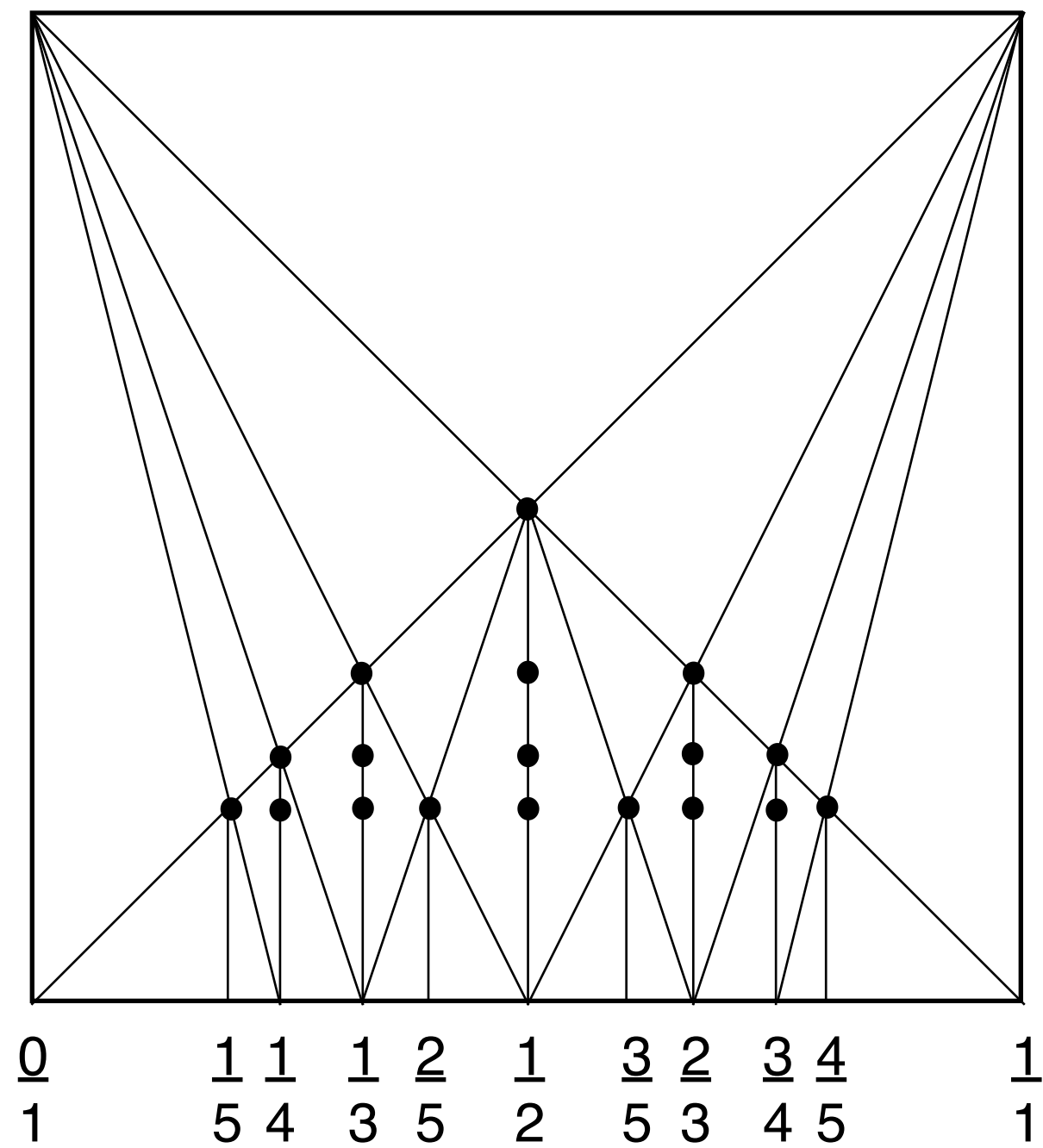
F₃



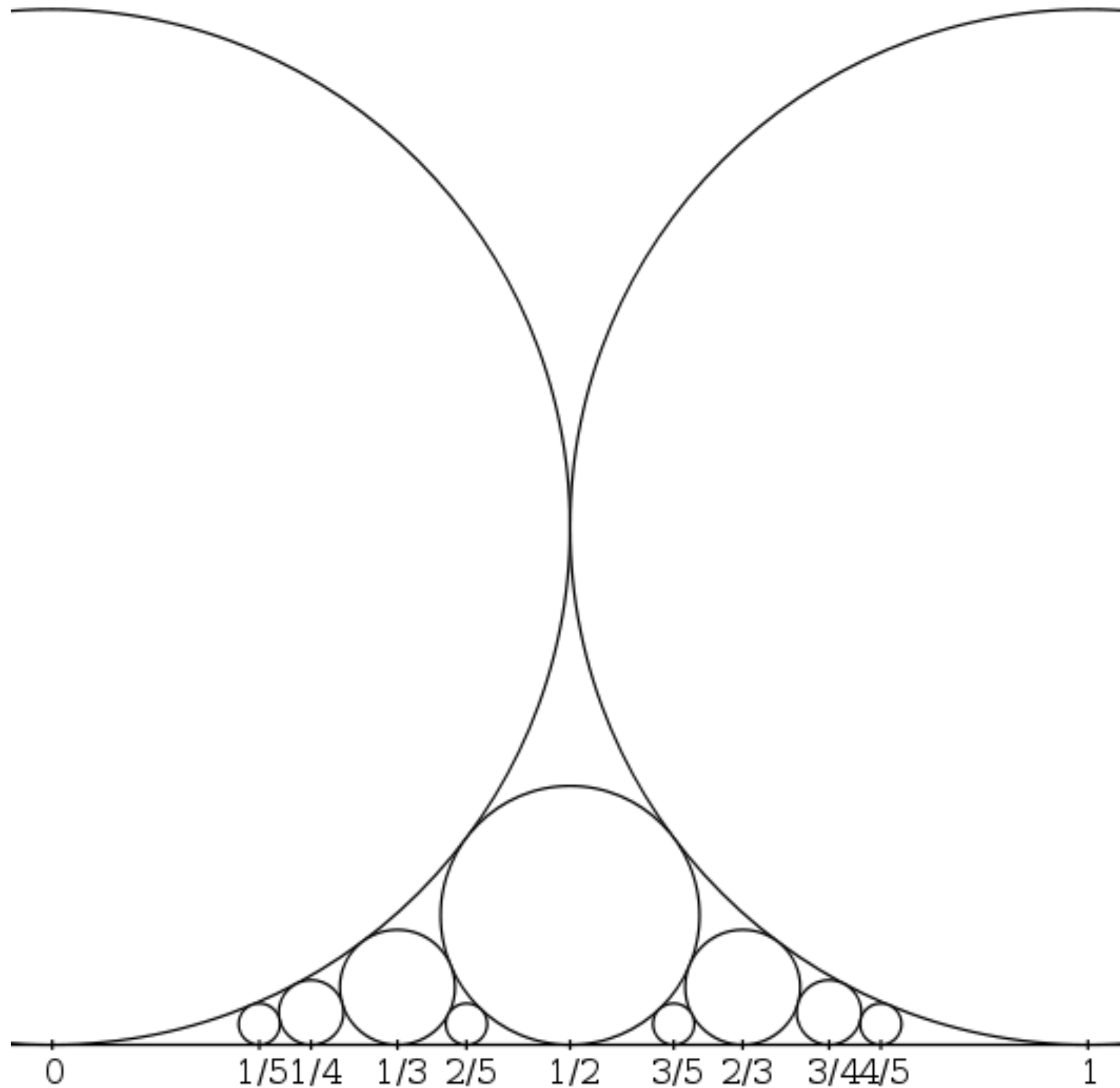
F₄

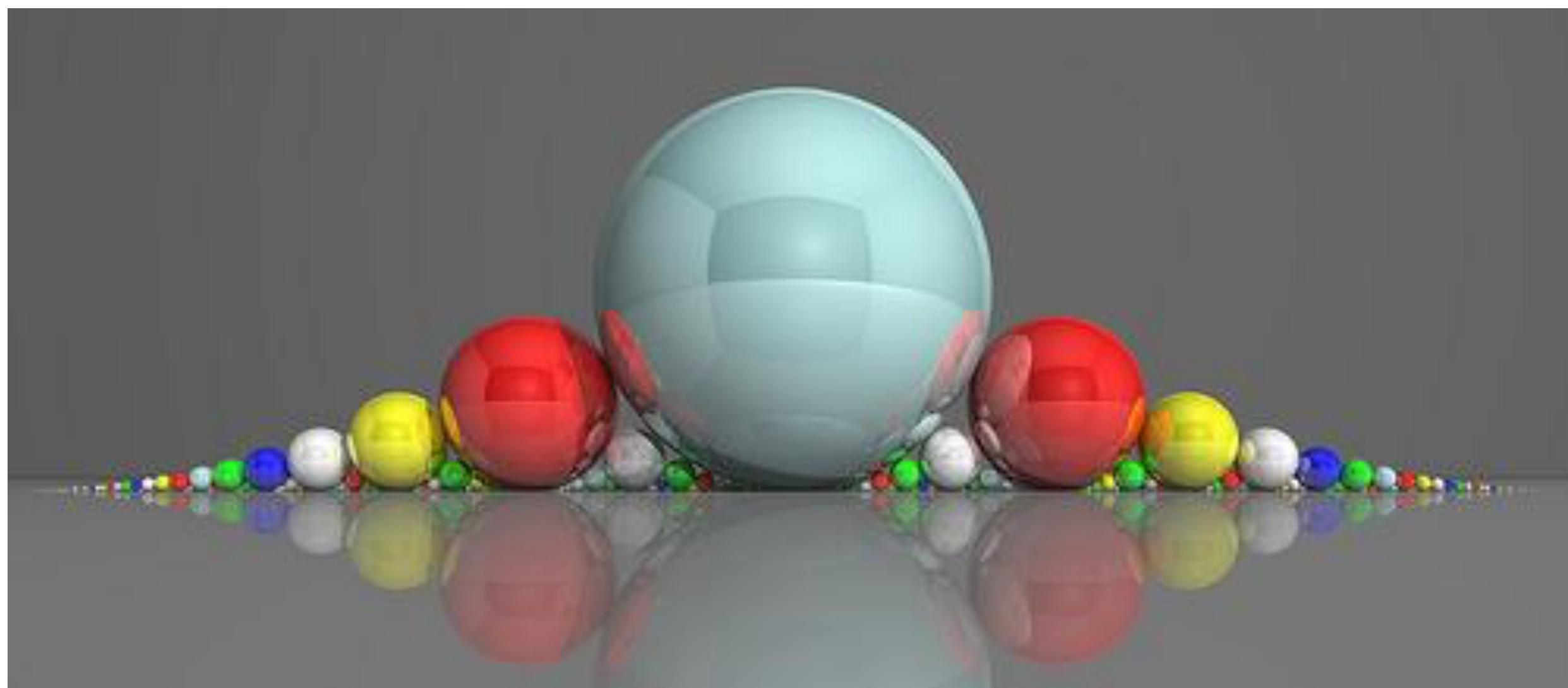


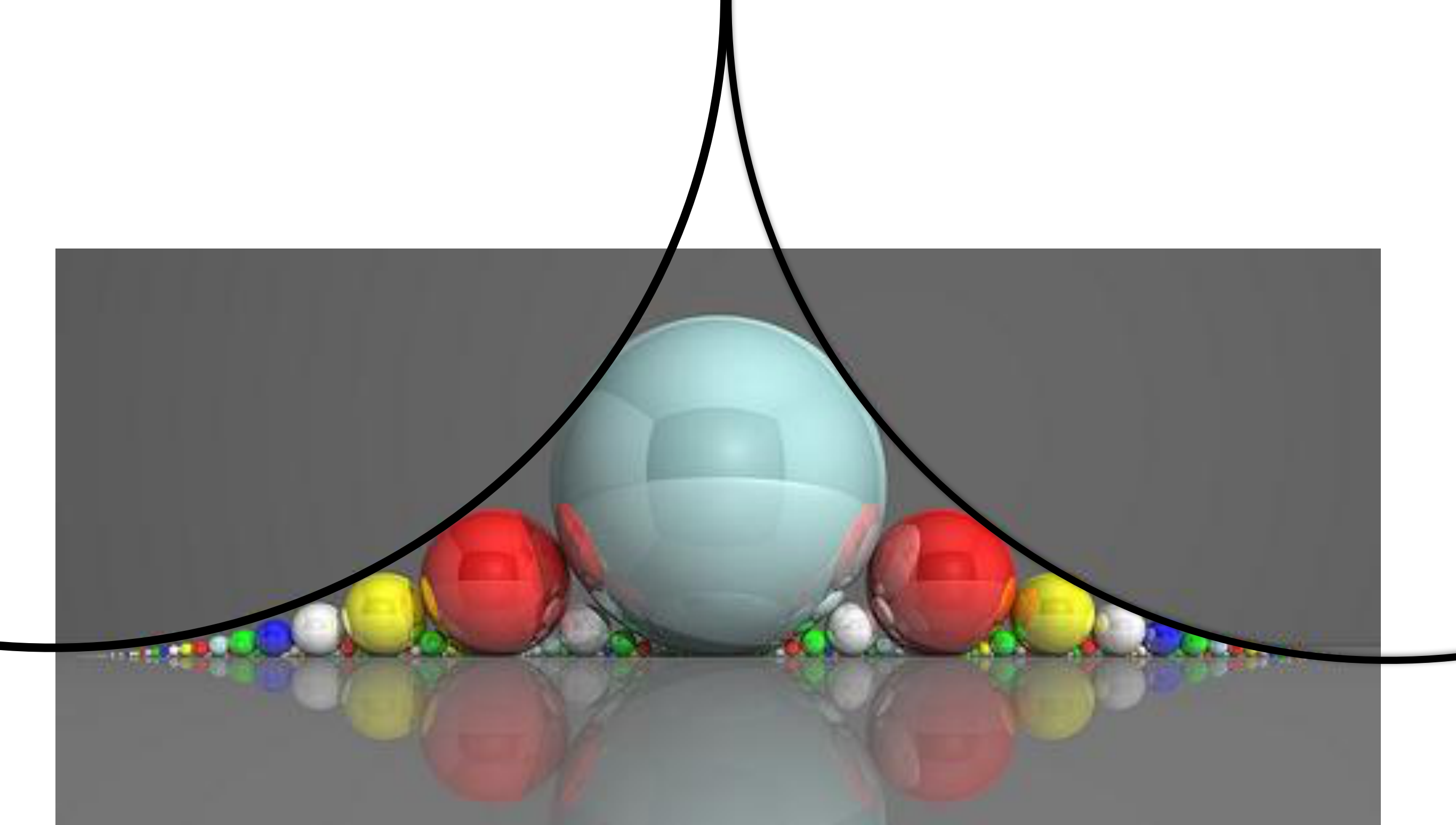
F₅



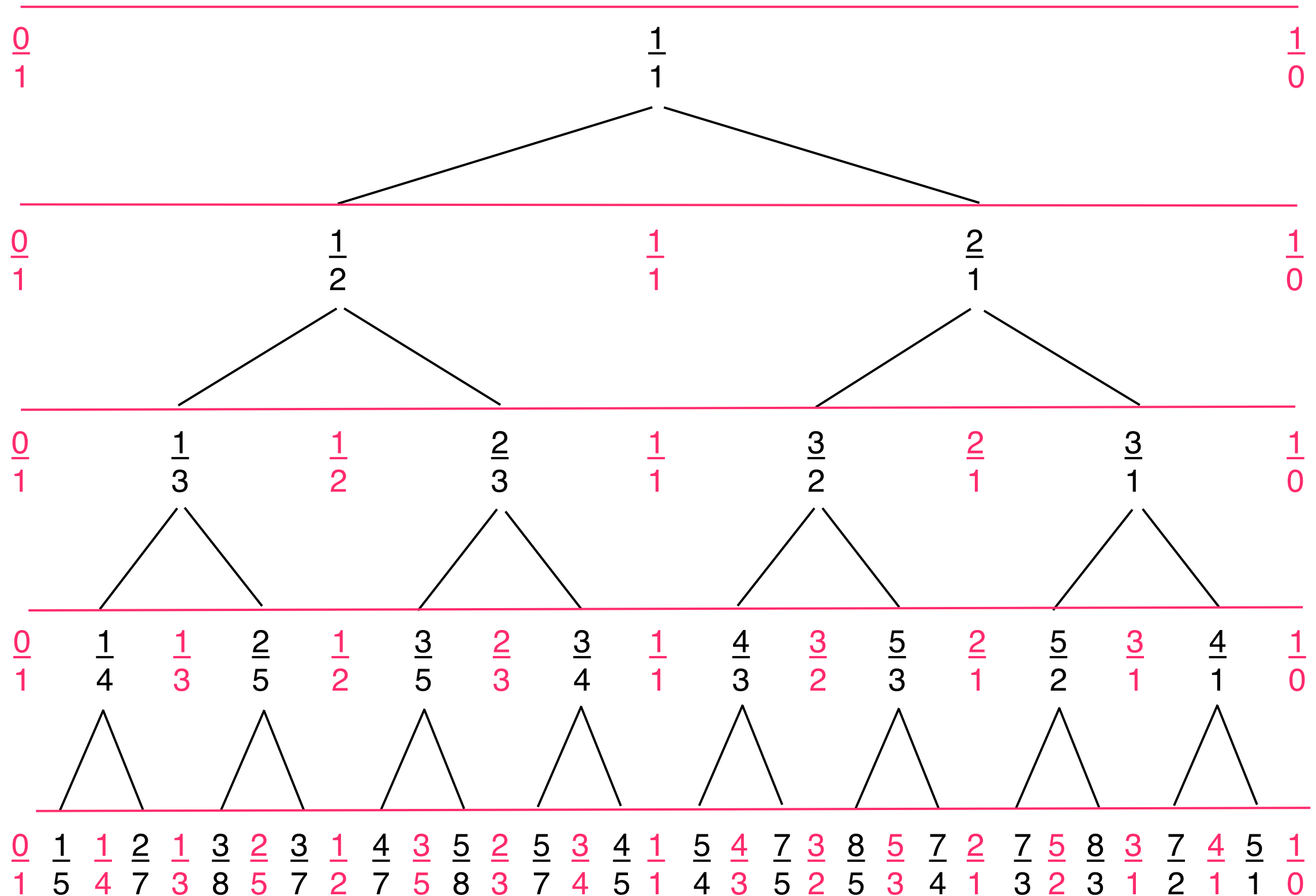
Ford circles



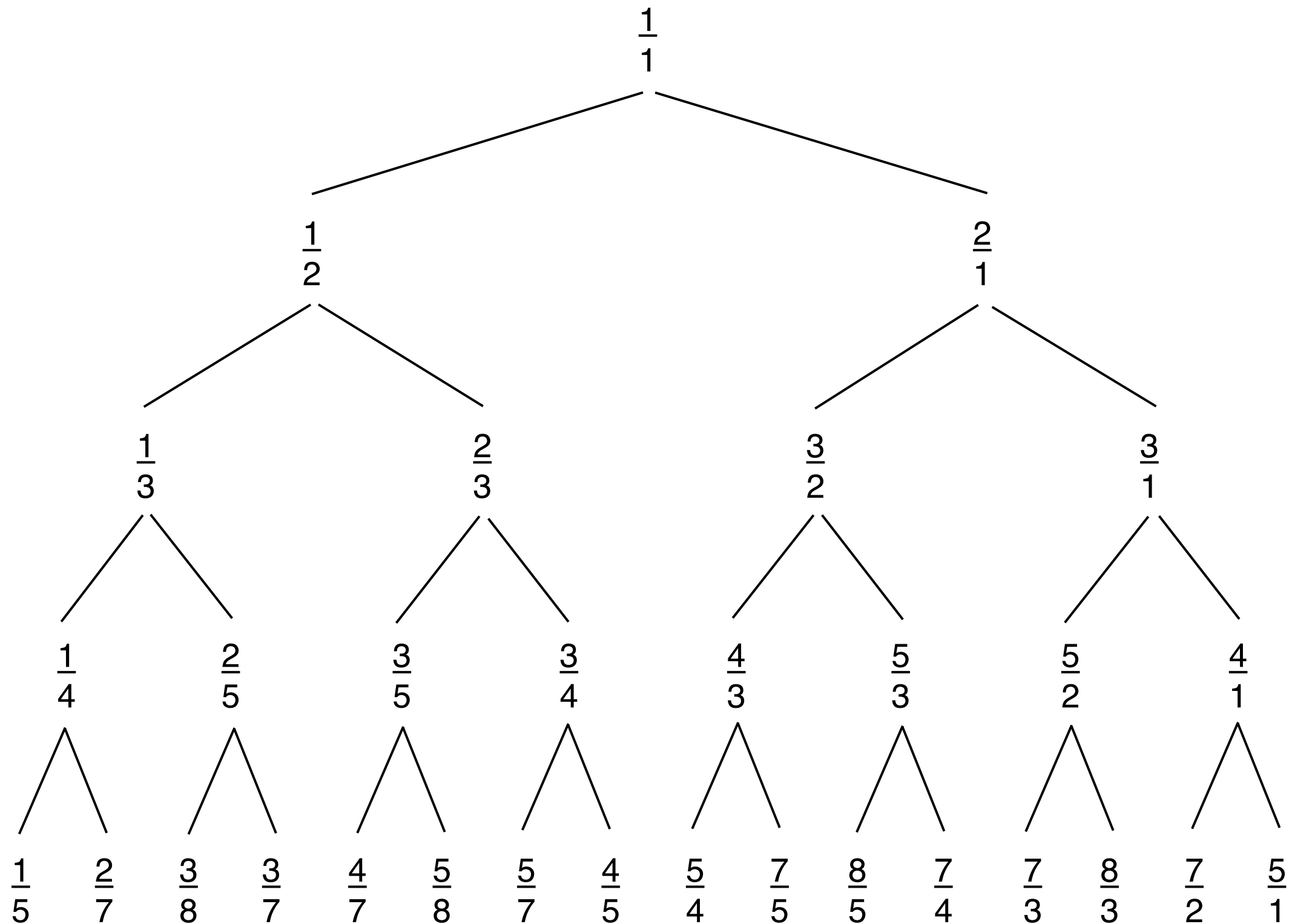


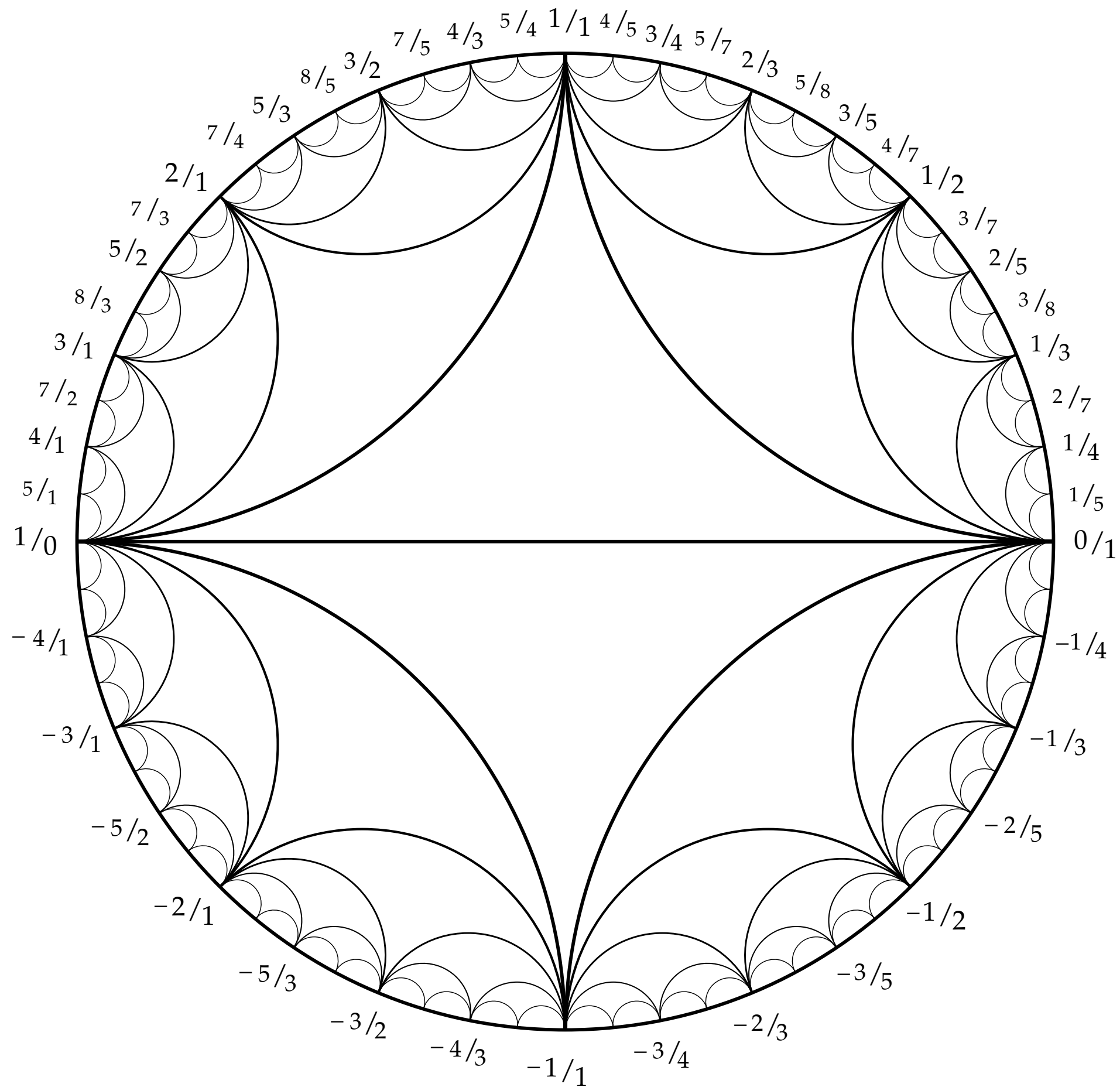


Stern-Brocot Tree (construction)



Stern-Brocot Tree





Calkin Wilf Tree

