Gainesville College

Round 3: $+ \; + \; = 2 \Rightarrow (\; + \; + \;)^2 = (2)^2$. So,

$$^2 + \;^2 + \;^2 + 2\; + 2\; + 2\; = 4 \Rightarrow \;^2 + \;^2 + \;^2 + 2(\; + \; + \;) = 4.$$

Since $\; + \; + \; = 1$, we have

$$^2 + \;^2 + \;^2 + 2 = 4 \Rightarrow \;^2 + \;^2 + \;^2 = 2.$$


Round 4: $-$

Round 6:    The total number of crossing points is $10 \times 7 = 70$. The total number of ordered pairs of points is $70 \times 69 = 4830$. The number of ordered horizontal pairs is $7 \times 6 \times 10 = 420$. The number of ordered vertical pairs is $10 \times 9 \times 7 = 630$. The number of ordered non-vertical, non-horizontal pairs is $4830 - 420 - 630 = 3780$.

Round 10:     Let $\theta = {}^{-1}\!\left(\dfrac{4}{3}\right)$.  Then the triangle at the right could be drawn.

By the Pythagorean Theorem, the length of the hypotenuse is 5, and $\theta = \dfrac{4}{5}$.  Therefore,

$$\left({}^{-1}\!\left(\left({}^{-1}\!\left(\left({}^{-1}\!\left(\frac{4}{3}\right)\right)\right)\right)\right)\right) = \left({}^{-1}\!\left(\left({}^{-1}\!\left(\frac{4}{5}\right)\right)\right)\right)$$

Now, let $\phi = {}^{-1}\!\left(\dfrac{4}{5}\right)$