Break time

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Binary triangle — **Decimal notation**

1(1) → **1**

1(2) 1(1) → **3**

1(4) 11(6) 1(1) → **11**

1(8) 101(20) 111(14) 1(1) → **43**

1(16) 111(56) 10001(68) 1111(30) 1(1) → **171**

1(32) .... 1(1) → **683**

1, 3, 11, 43, 171, 683, ... ⇒ $a_n = \frac{1}{6}\left(2^{2n}+2\right)$

Root of $a_n = \frac{1}{6}\left(2^{2n}+2\right)$ $\boxed{n = \frac{2i\pi m + i\pi + \log(2)}{2\log(2)}, m \in Z}$

Riemann hypothesis

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$$\zeta(s) = 1 + \frac{1}{2^s} + \frac{1}{3^s} + \frac{1}{4^s} + \frac{1}{5^s} + \frac{1}{6^s} + \frac{1}{7^s} + \cdots + \frac{1}{\infty^s}$$

$$\zeta(s) = 1 + \frac{1}{2^s} + \frac{1}{3^s} + \frac{1}{4^s} + \frac{1}{5^s} + \frac{1}{1^s} + \frac{1}{2^s} + \cdots + \frac{1}{3^s}$$

$$\infty = 5m + 3 \quad \therefore m = \frac{\infty - 3}{5} = 0$$

$$\zeta(s) = \left(\frac{\infty - 3}{5}\right)\left(1 + \frac{1}{2^s} + \frac{1}{3^s} + \frac{1}{4^s} + \frac{1}{5^s}\right) + \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$$

$$\zeta(s) = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s} = 1 + \frac{1}{2^s} + \frac{1}{3^s} = 0 \quad \therefore 2^s + 3^s = -1$$

$$2^s + 3^s = 27^s + 8^s = 3^{3s} + 2^{2s} = 3^{-2s} + 2^{-2s}$$

$$3^{-2s} + 2^{-2s} = \frac{1}{9^s} + \frac{1}{4^s} = \frac{1}{4^s} + \frac{1}{4^s} = \frac{2}{4^s} = -1$$

$$\therefore 4^s = -2$$

$$\boxed{\therefore s = \frac{2i\pi n + i\pi + log2}{2log2}, \quad n \in z} \qquad \therefore s = \frac{2i\pi n + i\pi}{2log2} + \frac{1}{2}$$

That's all (proof end)