Symbol	Meaning	Value
$\zeta(3)$	Apery's constant	1.202...
B	Backhouse's constant	1.456...
e	Base of the natural logarithm	2.718...
K	Catalan's constant	0.915...
π	Circle constant	3.141...
γ	Euler-Mascheroni constant	0.577...
α	Feigenbaum's alpha	2.502...
δ	Feigenbaum's delta	4.669...
ξ	Foias constant	1.187...
F	Fransén-Robinson constant	2.807...
G	Gauss's constant	0.834...
A	Glaisher-Kinkelin constant	1.282...
ϕ	Golden ratio	1.618...
η	Grossman's constant	0.737...
ρ	Kepler-Bouwkamp constant	0.114...
K_0	Khinchin's constant	2.685...
q	Komornik-Loreti constant	1.787...
K_{LR}	Landau-Ramanujan constant	0.764...
L	Lemniscate constant	2.622...
M_3	Madelung constant	-1.747...
M	Meissel-Mertens constant	0.261...
C	Niven's constant	1.705...
Ω	Omega constant	0.567...
σ_p	Paper folding constant	0.850...
μ	Ramanujan-Soldner constant	1.451...
ψ	Reciprocal Fibonacci constant	3.359...
σ	Somos' quadratic recurrence constant	1.661...
Π_2	Twin primes constant	0.660...
P	Universal parabolic constant	2.295...

Constant Definitions

0.1 Backhouse's Constant, B

Let p_k be the kth prime. Let

$$P(x) = 1 + \sum_{k=1}^{\infty} p_k x^k$$

and in turn let

$$Q(x) = \frac{1}{P(x)} \\ = \sum_{k=0}^{\infty} q_k x^k.$$

Then Backhouse's constant is given by

$$B = \lim_{k\to\infty} \left| \frac{q_{k+1}}{q_k} \right|.$$

0.2 The Base of the Natural Logarithm, e

The base of the natural logarithm.

0.3 Catalan's Constant, K

$$K = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)^2}$$

0.4 The Circle Constant, π

The ratio of a circle's circumference to its diameter.

0.5 The Euler-Mascheroni Constant, γ

$$\gamma = \lim_{n\to\infty} \left(-\ln(n) + \sum_{k=1}^{n} \frac{1}{k} \right)$$

0.6 Feigenbaum's α and δ Constants

Consider a species where the population of one generation depends on the population of the prior generation according to the recurrence relation

$$P_n = rP_{n-1}\left(1 - P_{n-1}\right)$$

where r is a constant parameter. As n goes to ∞, you might expect the population to settle on an equilibrium value. The value of the parameter r controls what this equilibrium value is. For many values of r, we see the population settle on a single value. However, for other values, the population may cycle back and forth between two or three (or more) values with successive generations. This behavior can be visualized in a bifurcation plot, like Figure 1.

When r is less than one, the population drops every generation, settling on 0, as seen in the plot. When r is about 2, the population settles near 0.5. When r is 3.2, the population will vacillate between two different sizes with successive generations. At 3.5, we cycle between four different sizes. If we pay attention to the values of r at which these splits (bifurcations) happen, we can find the δ constant.

If three consecutive bifurcations occur at r values of r_n, r_{n+1}, and r_{n+2}, then let the lengths

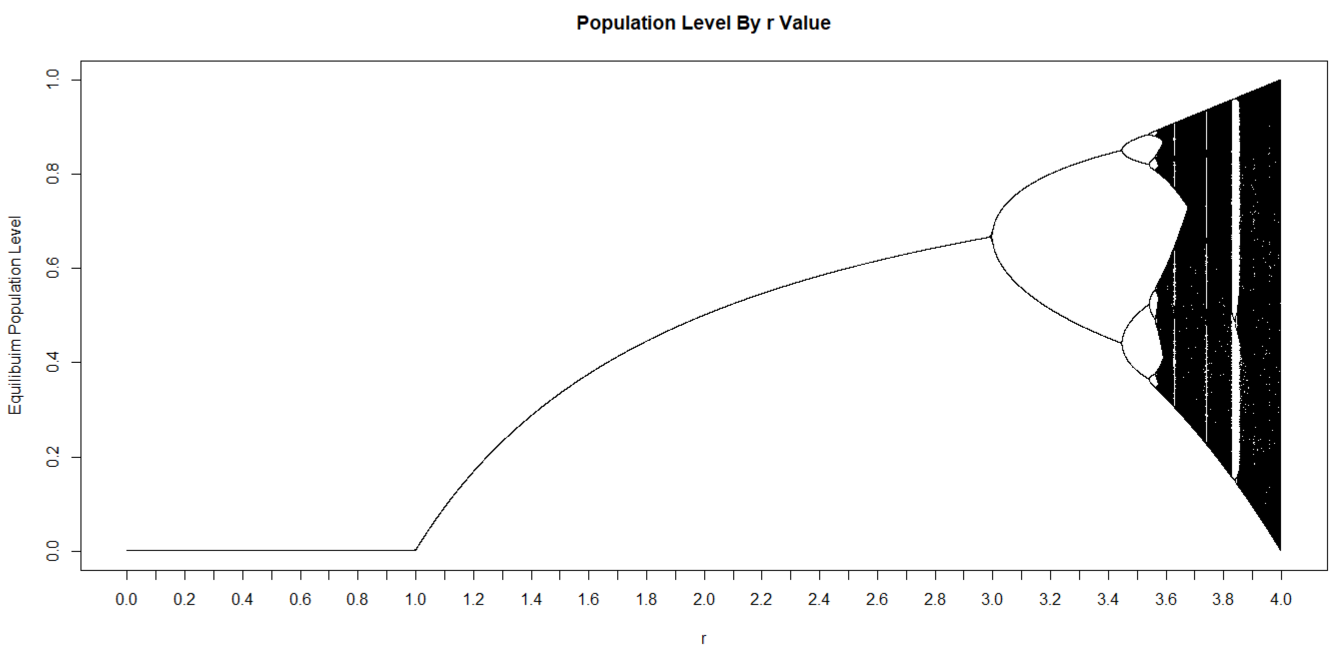
$$L_n = r_{n+1} - r_n \text{ and}$$
$$L_{n+1} = r_{n+2} - r_{n+1}.$$

We then get

$$\delta = \lim_{n\to\infty} \frac{L_n}{L_{n+1}}.$$

The α constant is found similarly. When a bifurcation occurs, two "tines" arise. If we then increase r until just before the next bifurcation occurs, we can record the distance between the tips of those two tines. The ratio of these distances for successive bifurcations converges to the α constant.

Figure 1: Bifurcation diagram for the logistic map



0.7 Foias Constant, ξ

Let $x_1 > 0$ and

$$x_{n+1} = \left(1 + \frac{1}{x_n}\right)^n.$$

Then there is exactly one value of $x_1 = \xi$ such that $x_n \to \infty$.

0.8 The Fransén-Robinson Constant, F

$$F = \int_0^\infty \frac{dx}{\Gamma(x)}$$

Where

$$\Gamma(x) = \int_0^\infty t^{x-1} e^{-t} dt$$

0.9 Gauss's Constant, G

$$G = \frac{1}{\mathrm{agm}(1, \sqrt{2})}$$

Where $\mathrm{agm}(a, b)$ is the arithmetic-geometric mean of a and b.

0.10 The Golden Ratio, ϕ

The greater of the two solutions to $x^2 = x + 1$, namely

$$\frac{1+\sqrt{5}}{2}.$$

0.11 Grossman's Constant, η

Define the sequence $a_0 = 1$, $a_1 = x$, and

$$a_n = \frac{a_{n-2}}{1 + a_{n-1}}.$$

This sequence converges for exactly one value of $x = \eta$.

0.12 The Kepler-Bouwkamp Constant, ρ

$$\rho = \prod_{k=3}^{\infty} \cos\left(\frac{\pi}{k}\right)$$

0.13 Khinchin's Constant, K_0

The coefficients of the continued fraction expansion of a real number almost always have a finite geometric mean which converges to this constant. That is, if

$$x = a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \cdots}},$$

then it is almost always true that

$$\lim_{n\to\infty} (a_1 a_2 \ldots a_n)^{1/n} = K_0.$$

0.14 The Komornik-Loreti Constant, q

The Thue-Morse sequence is defined by the recurrence relation

$$
\begin{aligned}
t_0 &= 0 \\
t_{2n} &= t_n \\
t_{2n+1} &= 1 - t_n
\end{aligned}
$$

The Komornik-Loreti constant, q, is the solution to

$$1 = \sum_{n=1}^{\infty} \frac{t_n}{q^n}$$

0.15 The Meissel-Mertens Constant, M

The value of the limit

$$\lim_{n\to\infty} \left(-\ln\left(\ln(n)\right) + \sum_{p\leq n} \frac{1}{p} \right)$$

for primes p.

0.16 Niven's Constant, C

If the prime factorization of an integer m is written as

$$m = (p_1^{a_1})(p_2^{a_2})(p_3^{a_3})\ldots,$$

then we define the function H as

$$H(m) = \max(a_1,\ a_2,\ a_3, \ldots).$$

Niven's constant is then given by the limit

$$C = \lim_{n\to\infty} \frac{1}{n} \sum_{m=1}^{n} H(m).$$

So C is the "average" greatest number of times a prime occurs in the prime factorization of an integer.

0.17 The Ω Constant

The solution to

$$xe^x = 1.$$

0.18 The Paper Folding Constant, σ_p

Take a strip of paper and fold it in half, right over left, infinitely often. Upon unfolding it, assign each "valley" crease a 1, and each "mountain" crease a 0. That sequence begins:

$$a = \{1, 1, 0, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, \ldots\}$$

Then,

$$\sigma_p = \sum_{n=1}^{\infty} \frac{a_n}{2^n}$$

0.19 The Ramanujan-Soldner Constant, μ

The Ramanujan-Soldner constant, μ, is the unique positive solution to

$$\int_0^x \frac{dt}{\ln(t)} = 0$$

0.20 The Reciprocal Fibonacci Constant, ψ

The value of the summation

$$\sum_{n=1}^{\infty} \frac{1}{F_n}$$

where F_n is the nth Fibonacci number.

0.21 Somos' Quadratic Recurrence Constant, σ

$$\begin{aligned} \sigma &= \sqrt{1\sqrt{2\sqrt{3\cdots}}} \\ &= \prod_{n=1}^{\infty} \left(\frac{1+n}{n}\right)^{2^{-n}} \end{aligned}$$

0.22 The Universal Parabolic Constant, P

The latus rectum of a parabola is the line segment whose end points lie on the parabola and which passes through its focus parallel to its directrix. The focal parameter of a parabola is the distance from its directrix to its focus. Let A be the arc length of the parabolic segment formed by the latus rectum of a parabola and p be the focal parameter of that parabola. The the universal parabolic constant is

$$\begin{aligned} P &= \frac{A}{p} \\ &= \ln(1+\sqrt{2}) + \sqrt{2}. \end{aligned}$$

1 January

$$1.01 = \sqrt[K]{e - C}$$
$$1.02 = -\left(\frac{M_3}{C}\right)$$
$$1.03 = \csc(\gamma\pi)$$
$$1.04 = \mu^{\rho}$$
$$1.05 = \sqrt[\sigma]{\frac{1}{K}}$$
$$1.06 = \cosh\left(\sqrt[M]{K_{LR}}\right)$$
$$1.07 = \frac{1}{\gamma\phi}$$
$$1.08 = \ln(\cosh(M_3))$$
$$1.09 = \frac{1}{K}$$
$$1.10 = \gamma^{\ln(G)} \quad \text{or} \quad \tan(G)$$
$$1.11 = P\log_G(K)$$
$$1.12 = \sqrt{P - \ln(F)} \quad \text{or} \quad \gamma - \ln(\gamma) \quad \text{or} \quad \cosh^{-1}(C)$$
$$1.13 = \ln^{\gamma}\left(\pi + \frac{1}{\pi}\right)$$
$$1.14 = \ln(\phi\cosh(A)) \quad \text{or} \quad \sinh(\tanh(P))$$
$$1.15 = \left(1 + \sqrt[(e-\pi)]{e}\right)^{\phi}$$
$$1.16 = \frac{e\sqrt[\phi]{\phi}}{\pi}$$
$$1.17 = \sec(\ln\gamma)$$
$$1.18 = \phi - \frac{1}{2\ln\pi}$$
$$1.19 = \tan^{-1}\alpha \quad \text{or} \quad \frac{\sqrt{2}}{\xi} \quad \text{or} \quad \sqrt[e]{\phi}$$
$$1.20 = \zeta(3) \quad \text{or} \quad \frac{\ln 2}{\gamma} \quad \text{or} \quad \sqrt{\mu}$$
$$1.21 = \ln\psi \quad \text{or} \quad \tan^{-1}K_0$$
$$1.22 = \frac{\mu}{\xi} \quad \text{or} \quad \frac{\sqrt{\pi}}{\mu}$$
$$1.23 = \sqrt{\frac{1}{\Pi_2}} \quad \text{or} \quad \sqrt{\pi - \phi}$$
$$1.24 = \frac{1}{\sinh\eta}$$

$$1.25 = \sqrt{1+\Omega} \quad \text{or} \quad \frac{\pi}{\alpha}$$
$$1.26 = e - B \quad \text{or} \quad \csc(K)$$
$$1.27 = \gamma + \ln 2 \quad \text{or} \quad K_0 - \sqrt{2} \quad \text{or} \quad \sqrt{\phi}$$
$$1.28 = A \quad \text{or} \quad \log_B(\phi)$$
$$1.29 = \cosh(\sigma - K) \quad \text{or} \quad \tan^{-1}(eA)$$
$$1.30 = \frac{\cosh^{-1}\phi}{\gamma\sqrt{2}} \quad \text{or} \quad \tan K$$
$$1.31 = \ln(\phi P) \quad \text{or} \quad \frac{\zeta(3)}{K}$$

2 February

$$2.01 = \sqrt[\xi]{P} \quad \text{or} \quad \cosh^{-1}(1+F)$$
$$2.02 = A(\gamma+1) \quad \text{or} \quad \Omega + B$$
$$2.03 = \sqrt{\phi+\alpha}$$
$$2.04 = \sqrt{B+e} \quad \text{or} \quad \frac{L}{A}$$
$$2.05 = \mu\sqrt{2} \quad \text{or} \quad \log_{\phi}(K_0)$$
$$2.06 = \frac{L}{\sqrt{\phi}}$$
$$2.07 = e^{\gamma^{\gamma}} \quad \text{or} \quad \pi\Pi_2$$
$$2.08 = \cosh^{-1}(\mu F) \quad \text{or} \quad \sqrt{\xi+\pi}$$
$$2.09 = \frac{\mu}{\ln 2}$$
$$2.10 = e - \frac{1}{\phi} \quad \text{or} \quad \frac{B}{\ln 2}$$
$$2.11 = \frac{\gamma}{\sigma_p - \gamma} \quad \text{or} \quad \sqrt{CL}$$
$$2.12 = B^2 \quad \text{or} \quad \ln(\tan\mu)$$
$$2.13 = \cos^{-1}\left(\frac{1}{G-e}\right) \quad \text{or} \quad \sqrt[K]{2}$$
$$2.14 = \frac{\sqrt{2}}{\Pi_2}$$
$$2.15 = e - \Omega$$
$$2.16 = \sqrt{\delta} \quad \text{or} \quad \delta - \alpha$$
$$2.17 = \cos(M) + \tan^{-1}(L)$$
$$2.18 = \sqrt[A]{e} \quad \text{or} \quad \frac{1+e}{C}$$
$$2.19 = \frac{1}{B-1}$$
$$2.20 = \sqrt{\pi \ln \delta}$$
$$2.21 = \pi^{\ln(2)}$$
$$2.22 = \cosh^{-1}(\delta) \quad \text{or} \quad \phi^{\sigma}$$
$$2.23 = (1+\Omega)^q \quad \text{or} \quad \log_{\mu}(P)$$
$$2.24 = \sqrt[\sigma]{\frac{1}{M}}$$
$$2.25 = \sqrt{\alpha + K + \sigma}$$
$$2.26 = \frac{e}{\zeta(3)}$$

$$2.27 = q^{\sqrt{2}}$$
$$2.28 = K_0^G$$
$$2.29 = P$$

3 March

$$3.01 = \phi^{\alpha K}$$
$$3.02 = \phi^{B+\sin(1)}$$
$$3.03 = \frac{1}{\rho - \cos(q)}$$
$$3.04 = \frac{\pi}{\ln F}$$
$$3.05 = \delta - \phi$$
$$3.06 = \phi + \frac{1}{\ln 2} \quad \text{or} \quad \pi^{\sqrt[4]{K}}$$
$$3.07 = \alpha + \Omega$$
$$3.08 = \delta \Pi_2 \quad \text{or} \quad L + \frac{B}{\pi}$$
$$3.09 = P^{\frac{e}{2}}$$
$$3.10 = \pi \ln K_0$$
$$3.11 = \log_\mu (L + \Omega)$$
$$3.12 = -\frac{\ln \pi}{\ln(\ln 2)}$$
$$3.13 = K_0^{\frac{\pi}{e}}$$
$$3.14 = \pi \quad \text{or} \quad \zeta(3) + \frac{\phi}{G}$$
$$3.15 = \gamma + \sqrt[A]{\psi}$$
$$3.16 = C + B \quad \text{or} \quad \pi B - \sqrt{2}$$
$$3.17 = \frac{\alpha}{C - K}$$
$$3.18 = e^{\sin^{-1}(K)} \quad \text{or} \quad \sqrt{\pi} + \sqrt{2}$$
$$3.19 = P\sqrt{\sinh \sqrt{2}} \quad \text{or} \quad K_0 \sqrt[4]{2}$$
$$3.20 = \sqrt[e]{\frac{e}{\rho}} \quad \text{or} \quad \frac{1}{e\rho}$$
$$3.21 = \frac{\delta\sqrt{\gamma + \Pi_2}}{\phi} \quad \text{or} \quad K + P$$
$$3.22 = \pi - \ln(\tanh \phi)$$
$$3.23 = \delta - \sqrt[e]{K_0} \quad \text{or} \quad \frac{\tan B}{K_0}$$
$$3.24 = q \cosh(\zeta(3)) \quad \text{or} \quad B + q$$
$$3.25 = \cosh(\xi + \Pi_2) \quad \text{or} \quad B^\pi$$
$$3.26 = F^{\ln \pi} \quad \text{or} \quad \eta^2 + e$$

$$3.27 = \sinh^{-1}\left((\gamma + F)\sqrt[\eta]{e}\right) \quad \text{or} \quad \xi A - M_3$$
$$3.28 = e\sqrt{B} \quad \text{or} \quad \sigma + \sqrt{L}$$
$$3.29 = e - \frac{1}{M_3} \quad \text{or} \quad e + \gamma$$
$$3.30 = \frac{e}{\tan\left(\frac{1}{\mu}\right)} \quad \text{or} \quad \frac{F}{\sigma_p}$$
$$3.31 = \sqrt{A} + \cosh\sqrt{2} \quad \text{or} \quad L + \frac{1}{\mu}$$

4 April

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$$5.12 = \sigma^{\delta/\mu} \quad \text{or} \quad \pi + \Omega + \sqrt{2}$$
$$5.13 = -\tan\left(\frac{1}{\Omega}\right)$$
$$5.14 = K_0^{\cosh^{-1}(e)} \quad \text{or} \quad e^{\sqrt{K_0}}$$
$$5.15 = \alpha^q \quad \text{or} \quad \frac{\tan(\mu)}{\phi} \quad \text{or} \quad \delta\tan(G)$$
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6 June

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7 July

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$$7.24 = **$$
$$7.25 = **$$
$$7.26 = **$$
$$7.27 = \pi^{\rho+\phi}$$
$$7.28 = e^{\sqrt{K_0}}\sqrt{2}$$
$$7.29 = \frac{G}{\tanh(\rho)}$$
$$7.30 = \sqrt{\sinh(\delta)}$$
$$7.31 = \alpha^{\sigma} + e \quad \text{or} \quad Ce^{B}$$

8 August

$$8.01 = **$$
$$8.02 = **$$
$$8.03 = \ln(2)\cosh(\pi)$$
$$8.04 = e^{\sqrt{\phi K_0}}$$
$$8.05 = \frac{\alpha K_0}{G}$$
$$8.06 = \sinh\left(\frac{\psi}{\sqrt{B}}\right)$$
$$8.07 = \sinh\sqrt{\sigma\delta}$$
$$8.08 = **$$
$$8.09 = **$$
$$8.10 = B^{\frac{B}{M}}$$
$$8.11 = \phi^{\frac{1}{2\rho}} \quad \text{or} \quad \alpha^{A+1}$$
$$8.12 = \frac{\alpha^{\psi}}{K_0} \quad \text{or} \quad \delta^{\frac{e}{2}}$$
$$8.13 = -\frac{K_0 M_3}{\gamma} \quad \text{or} \quad -\tan(1+\ln(2))$$
$$8.14 = e^P - q$$
$$8.15 = **$$
$$8.16 = **$$
$$8.17 = e^{\frac{B}{\ln(2)}}$$
$$8.18 = K_0 \log_B(\pi) \quad \text{or} \quad \left(\sinh^{-1} P\right)^{\delta}$$
$$8.19 = 2^{\frac{\sinh\alpha}{2}} \quad \text{or} \quad \sigma^{\psi} + K_0$$
$$8.20 = \cosh(F) - \rho \quad \text{or} \quad \frac{\log_{\phi} F}{M}$$
$$8.21 = \alpha^P \quad \text{or} \quad K + \sinh(K_0)$$
$$8.22 = **$$
$$8.23 = \left(\frac{\pi}{2}\right)^{\delta} \quad \text{or} \quad e^{(K+F)^{\Omega}}$$
$$8.24 = B^{q\pi} \quad \text{or} \quad e\log_{\sigma}(\delta)$$
$$8.25 = \sinh(F) \quad \text{or} \quad \log_K\left(\frac{1}{e}\right) - \pi$$

$$8.26 = \frac{Ke}{\rho L} \quad \text{or} \quad \psi - FM_3$$

$$8.27 = \delta\sqrt{\pi} \quad \text{or} \quad e^{\mu B} \quad \text{or} \quad \frac{-\log(\rho)}{M}$$

$$8.28 = \frac{q - G}{\rho}$$

$$8.29 = **$$

$$8.30 = **$$

$$8.31 = \cosh(F) \quad \text{or} \quad K - \tan(C) \quad \text{or} \quad \psi^{-M_3}$$

9 September

$$9.01 = \cosh(B)^{\gamma\delta} \quad \text{or} \quad \pi^{\phi}\sqrt{2}$$
$$9.02 = \pi F^{G^{(\alpha-L)}} \quad \text{or} \quad \psi K_0$$
$$9.03 = C^{PC}$$
$$9.04 = \sqrt[\Omega]{eA} \quad \text{or} \quad \sigma^{\frac{\alpha}{\gamma}} \quad \text{or} \quad \psi^{\frac{e+K}{2}}$$
$$9.05 = **$$
$$9.06 = **$$
$$9.07 = **$$
$$9.08 = **$$
$$9.09 = **$$
$$9.10 = **$$
$$9.11 = **$$
$$9.12 = **$$
$$9.13 = **$$
$$9.14 = \delta + K_0 + q \quad \text{or} \quad \ln(\psi)\sinh(e)$$
$$9.15 = B + \sqrt[M]{C} \quad \text{or} \quad \frac{F}{1-\ln(2)} \quad \text{or} \quad e\,(\sigma + C)$$
$$9.16 = K_0\,(e + \ln 2) \quad \text{or} \quad \phi + \sinh(e)$$
$$9.17 = \phi(1+\delta) \quad \text{or} \quad \sigma\delta + \sqrt{2} \quad \text{or} \quad Fe\zeta(3)$$
$$9.18 = \cosh(B+\mu)$$
$$9.19 = \mu\sqrt[G]{\delta} \quad \text{or} \quad \mu\tan\left(\sqrt{2}\right)$$
$$9.20 = \sqrt[\pi]{\rho} + \frac{1}{\rho} \quad \text{or} \quad (\mu+\pi)^{B}$$
$$9.21 = \delta + \phi F \quad \text{or} \quad \sqrt[M]{q}$$
$$9.22 = \psi^{\sqrt{\psi}} \quad \text{or} \quad \frac{\pi\psi}{\ln\pi}$$
$$9.23 = \frac{\cosh^{-1}(\phi)}{\rho} \quad \text{or} \quad \frac{1}{\rho} + \ln C$$
$$9.24 = \frac{1}{\rho} + \sinh^{-1}\Omega$$
$$9.25 = \sinh(\pi) - P \quad \text{or} \quad \sqrt[q]{\sinh(\delta)}$$

$$9.26 = \frac{1}{\frac{1}{\pi} + \mu - \sigma} \quad \text{or} \quad \frac{\sinh(\phi)}{M}$$

$$9.27 = \gamma + \frac{1}{\rho} \quad \text{or} \quad \sinh\left(\psi - \frac{\xi}{e}\right)$$

$$9.28 = e + \alpha L \quad \text{or} \quad \frac{\pi C}{\gamma}$$

$$9.29 = (\delta + 1)\sqrt{K_0} \quad \text{or} \quad \pi \cosh\left(M_3\right)$$

$$9.30 = P(\psi + \ln 2) \quad \text{or} \quad \pi e\sqrt{\xi}$$

10 October

$$10.01 = \frac{1+\phi}{M}$$

$$10.02 = \frac{e^2}{\eta} \quad \text{or} \quad \frac{L}{M}$$

$$10.03 = \pi^{\csc(L)}$$

$$10.04 = \frac{B}{\rho} - L \quad \text{or} \quad \alpha + \sinh(e)$$

$$10.05 = \tan\left(\frac{G}{\Omega}\right) \quad \text{or} \quad \frac{\sec\mu}{G}$$

$$10.06 = \frac{\cosh P}{-K+\sqrt{2}}$$

$$10.07 = \delta + e + K_0 \quad \text{or} \quad B\cosh L$$

$$10.08 = \sinh\left(\frac{C}{\Omega}\right) \quad \text{or} \quad \cosh\left(\sqrt[G]{\alpha}\right)$$

$$10.09 = \frac{\zeta(3)}{\rho} - \frac{1}{e} \quad \text{or} \quad \sinh(\delta - \sigma)$$

$$10.10 = -\frac{\phi^2\sqrt{2}}{\ln\ln 2} \quad \text{or} \quad e(e+1)$$

$$10.11 = \frac{1}{\rho} + \sqrt{2}$$

$$10.12 = \frac{\mu}{\rho} - \alpha$$

$$10.13 = \sqrt[\Omega]{\gamma + \pi}$$

$$10.14 = \cosh(\delta - \sigma)$$

$$10.15 = \frac{e}{\tanh^{-1} M}$$

$$10.16 = \sinh\left(\alpha + \sqrt{M}\right)$$

$$10.17 = \frac{\xi + \sqrt{2}}{\tan^{-1} M}$$

$$10.18 = \tan(\cosh^{-1} P)$$

$$10.19 = (\sigma + \ln 2)(\pi + \xi)$$

$$10.20 = \frac{\delta}{\Pi_2 \ln 2}$$

$$10.21 = \sqrt[-\gamma]{M}$$

$$10.22 = \frac{K_0 F}{\eta}$$
$$10.23 = L + \cosh{(e)}$$
$$10.24 = L(e + \xi) \quad \text{or} \quad e + \sqrt[\Omega]{\pi}$$
$$10.25 = \psi \csc(F)$$
$$10.26 = e + \sinh(e) \quad \text{or} \quad e\pi\zeta(3)$$
$$10.27 = \frac{1}{G - \eta} \quad \text{or} \quad \frac{e}{\sin^{-1} M}$$
$$10.28 = \frac{\phi\sigma}{M}$$
$$10.29 = \zeta(3)^{B/\rho}$$
$$10.30 = \frac{e}{\rho P}$$
$$10.31 = P^F$$

11 November

$$11.01 = q^{e+\sqrt{2}}$$
$$11.02 = q(\psi + F)$$
$$11.03 = \sinh(\pi)\tan^{-1}\sqrt{2} \quad \text{or} \quad e + \cosh F$$
$$11.04 = \frac{\pi^{\phi}}{\gamma} \quad \text{or} \quad \frac{F\delta}{\xi}$$
$$11.05 = (\Pi_2 + \delta)\sqrt[\sigma]{\psi}$$
$$11.06 = L\sqrt[\gamma]{P}$$
$$11.07 = (\pi + \ln 2)\log_C(\delta)$$
$$11.08 = \cosh\left(\frac{q}{\gamma}\right)$$
$$11.09 = \frac{\psi\delta}{\sqrt{2}}$$
$$11.10 = \frac{\alpha}{\ln(B)\tanh(\ln 2)}$$
$$11.11 = BFe$$
$$11.12 = \Omega M - \tan(\sigma)$$
$$11.13 = \gamma + \psi\pi$$
$$11.14 = \psi\ \sqrt[\ln(2)]{P}$$
$$11.15 = F^{\frac{F}{\zeta(3)}} \quad \text{or} \quad \frac{A}{\rho}$$
$$11.16 = L + \pi e \quad \text{or} \quad L^{\alpha}$$
$$11.17 = \frac{1}{F - e}$$
$$11.18 = \sinh(\pi) - \frac{1}{e}$$
$$11.19 = \frac{e^2}{\Pi_2}$$
$$11.20 = \left(\frac{F}{\xi}\right)^F \quad \text{or} \quad (\delta + e)\sqrt[A]{C}$$
$$11.21 = \frac{L\sinh\left(\sqrt{L}\right)}{\Omega}$$
$$11.22 = \frac{\sinh e}{\sin\eta} \quad \text{or} \quad \psi + \pi\alpha$$
$$11.23 = \psi PB$$
$$11.24 = \tan(\phi K)$$
$$11.25 = \cosh(e\ln\pi)$$

$$11.26 = \cosh\left(\mu + \sigma\right)$$

$$11.27 = \frac{M_3 - \ln 2}{\sin \psi}$$

$$11.28 = \psi^2 \quad \text{or} \quad \sqrt[\gamma]{\frac{F}{\ln 2}}$$

$$11.29 = \sinh\left(C + \sqrt{2}\right)$$

$$11.30 = \delta e - \sigma G$$

12 December

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