I. LARGE FORMULAS

1. *Primes and the zeta function:*

$$\prod_p \frac{1}{1-\frac{1}{p^s}} = \sum_{n=1}^{\infty} \frac{1}{n^s}$$

7. *Newton's Law of Gravitation:*

$$F = \frac{Gm_1m_2}{r^2}$$

12. *Maxwell's Equations in Vacuum:*

$$\begin{array}{lll} \nabla \cdot \mathbf{B} = 0 & \nabla \cdot \mathbf{E} = 0 & \nabla \times \mathbf{E} = -\frac{1}{c}\frac{\partial \mathbf{B}}{\partial t} \\ \nabla \times \mathbf{B} = \frac{1}{c}\frac{\partial \mathbf{E}}{\partial t} & \nabla \times \mathbf{E} = -\frac{1}{c}\frac{\partial \mathbf{B}}{\partial t} & \nabla \cdot \mathbf{E} = 0 \end{array}$$

14. *Einstein's General Relativity Equation:*

$$R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} = 8\pi T_{\mu\nu}$$

16. *Heisenberg Uncertainty Principle:*

$$\Delta x \Delta p \geq \hbar/2$$

22. *Stokes' Theorem*

$$\int_M d\omega = \int_{\partial M} \omega$$

$$\int_M d\omega$$

$$= \int_{\partial M} \omega$$

26. *Classical Gauss-Bonnet Theorem:*

$$\chi(M^2) = \frac{1}{2\pi}\int_M K \; dA$$

xy. *Kepler's Laws:*

$$r\frac{d\theta}{dt} = \mathrm{C}$$

$$\oint dt \ \propto \ (\mathrm{r_{min}} + \mathrm{r_{max}})^{\frac{3}{2}}$$

$$\oint dt \propto (\overline{r} + \underline{r})^{\frac{3}{2}}$$

$$\oint dt \propto (\overline{r} + \underline{r})^{3/2}$$

$$T = ka^{\frac{2}{3}}$$

$$T = ka^{2/3}$$

xz. *Hamilton's quaternion eq.:*

$$i^2 = j^2 = k^2 = ijk = -1$$

xw. *Conservation of energy-momentum:*

$$T^{\mu\nu}_{\ ,\ \nu} = 0$$

35. *Yang-Mills equation*

$$F = dA + A \wedge A$$

xu. *Self-dual*

$$*F = F$$

II SMALL FORMULAS IN IMAGE CAPTIONS

8. *Pythagoras' Theorem with no-word proof:*

$$c^2 = a^2 + b^2$$

xt. *knot polynomial*

$$q + q^3 - q^4$$

$$V_K(q) = q + q^3 - q^4$$

xs. *Babylonian tablet*

$$1; 24; 51; 10 = 1.414213\ldots$$

xr. *Schwartzschild radius*

$$r_S = 2Gm/c^2$$

xx. *Equation for Lorenz attractor:*

$$\frac{dx}{dt} = \sigma(y - x)$$
$$\frac{dy}{dt} = x(\rho - z) - y$$
$$\frac{dz}{dt} = xy - \beta z$$

58. *Platonic solids, Euler characteristic:*

$$V - E + F = 2$$

42. *Navier-Stokes equation:*

$$\partial_t v_i + v_j \partial_j v_i = -\partial_i p + \nu \partial_j \partial_j v_i$$

2. *Archimedes. Volume of Sphere:*

$$v = \frac{2}{3}V$$

19. *Limiting ratio of Fibonacci numbers = golden mean = partial fraction expansion:*

$$\lim_{n\to\infty} \frac{F_{n+1}}{F_n} = \frac{1+\sqrt{5}}{2} = 1 + \frac{1}{1+\frac{1}{1+\frac{1}{1+\ldots}}}$$

$$\frac{1+\sqrt{5}}{2} = 1 + \frac{1}{1+\frac{1}{1+\frac{1}{1+\ldots}}}$$

55. *Aharonov-Bohm Effect:*

$$\int_{C_2} \vec{A}\cdot d\vec{\ell} - \int_{C_1} \vec{A}\cdot d\vec{\ell} = \frac{1}{2\pi}\Phi$$

20. *Wilson loop average w.r.t Chern-Simons action gives knot invariant:*

$$\frac{1}{Z}\int_{\mathcal{A}} \mathrm{Tr}_{\mathbf{2}}\mathrm{P}\exp\left(-\oint_{\mathrm{K}}\mathrm{A}\right)\mathrm{e}^{\frac{\mathrm{ik}}{4\pi}\,\mathrm{CS(A)}}\mathcal{D}\mathrm{A}$$

$$\frac{1}{Z}\int_{\mathcal{A}} (\mathrm{Tr}_{\mathbf{2}}\mathrm{P}\oint_{\mathrm{K}}\mathrm{A})\,\mathrm{e}^{\frac{\mathrm{ik}}{4\pi}\,\mathrm{CS(A)}}\mathcal{D}\mathrm{A}$$

$$\frac{1}{Z}\int_{\mathcal{A}} (\mathrm{Tr}_{\mathbf{2}}\mathrm{P}\oint_{\mathrm{K}}\mathrm{A})\,\mathrm{e}^{\frac{\mathrm{ik}}{4\pi}\int_{\mathrm{M}}\mathrm{Tr}(\mathrm{A}\wedge\mathrm{dA}+\frac{2}{3}\mathrm{A}\wedge\mathrm{A}\wedge\mathrm{A})}\mathcal{D}\mathrm{A}$$

xq. *Volume of frustum of pyramid (from Moscow Papyrus:)*

$$V = \frac{1}{3}\cdot 6(2^2+4^2+2\cdot 4) = 56$$

3. *Yang-Baxter Equation*

$$R_{12}R_{23}R_{12} = R_{23}R_{12}R_{23}$$