Introduction, Approximation & Error in Computation

1. **WAP to generate and print π, e & φ correct up to 50 decimal places.**

$$\frac{\pi^2}{6} = \sum_{n=1}^{\infty} \frac{1}{n^2}$$

$$e = \lim_{n\to\infty} \left(1 + \frac{1}{n}\right)^n$$

$$\varphi = \frac{1 \pm \sqrt{5}}{2}$$

$$\pi = 3.14159265358979323846264338327950288419716939937510$$

$$e = 2.71828182845904523536028747135266249775724709369995$$

$$\varphi = 1.61803398874989484820458683436563811772030917980576 \; or,$$

$$\varphi = -0.61803398874989484820458683436563811772030917980576$$

2. **WAP to print Planck's constant** $(6.62607004 \times 10^{-34}\ \mathrm{m^2.\ kg.\ s^{-1}})$**, Gravitational constant** $(6.67408\ \times\ 10 - 11\ \mathrm{m^3.kg^{-1}.\ s^{-2}})$**, Permeability in free space** $(4\pi \times 10^{-7}\mathrm{m.\,kg.\,s^{-2}.\,A^{-2}})$**, Permittivity in free space** $(8.85418 \times 10^{-12} F.m^{-1})$**, Electronic charge** $(1.60217662 \times 10^{-19}\mathrm{C})$ **in engineering & scientific notation. In engineering notation power is multiple of 3 whereas it is not necessary in scientific notation.**
3. **Round off a number to** nth **significant figure and calculate rounding error.**
4. **Truncate a number to** nth **significant figure and calculate truncating error.**
5. **Find absolute and relative error in writing**
   - ***a.*** $3! = 3.0000001!$
   - ***b.*** $3!! = 3.0000001!!$
   - ***c.*** $e^6 = \pi^4 + \pi^5$
   - ***d.*** $3753^3 = 3230^3 + 2676^3$
   - ***e.*** $299792458 = 3 \times 10^8$