e^{ix} = cosx +isinx
$e^{i\pi}$ = -1

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - + \ldots$$

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - + \cdots$$

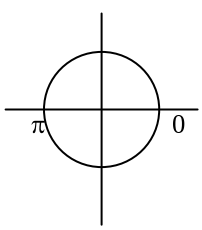
$$i \sin x = ix - \frac{ix^3}{3!} + \frac{ix^5}{5!} - + \cdots$$

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$$

$$e^{ix} = 1 + (ix) + \frac{(ix)^2}{2!} + \frac{(ix)^3}{3!} + \cdots$$

$$\therefore e^{ix} = 1 + ix - \frac{x^2}{2!} - \frac{ix^3}{3!} + \cdots$$

$$\therefore e^{ix} = \cos x + i \sin x$$



cosπ = -1
sinπ = 0

$$e^{i\pi} = \cos \pi + i \sin \pi = -1 + 0$$

$$e^{i\pi} = -1$$

iπ = ln (-1)