$$e^{(ix)} = 1 + (ix) + \frac{(ix)^2}{2} + \frac{(ix)^3}{3!} + \frac{(ix)^4}{4!} + \frac{(ix)^5}{5!} + \ldots$$

$$= 1 + ix - \frac{x^2}{2!} - \frac{ix^3}{3!} + \frac{x^4}{4!} + \frac{ix^5}{5!} + \ldots$$

$$= \left(1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \ldots\right) + i\left(x - \frac{x^3}{3!} + \frac{x^5}{5!} - \ldots\right)$$

$$e^{ix} = \cos x + i \sin x = cis(x)$$

$$2^2 = 4$$

$$i^3 = -i$$

$$(1+i)^2 = (1+i)(1+i) = 1 + i + i - 1 = 2i$$

$$2^i = \left(e^{\ln(2)} \right)^i = e^{i \ln(2)}$$

$$e^{i\theta} = \text{cis}(\theta)$$

$$2^i = \text{cis}(\ln 2)$$

$$= \cos(\ln 2) + i \sin(\ln 2)$$

$$2^2 \qquad 2^i \qquad 2^{1+i}$$

$$i^2 \qquad i^i \qquad i^{1+i}$$

$$(1+i)^2 \qquad (1+i)^i \qquad (1+i)^{1+i}$$

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

$$e^{i\theta} = \cos \theta + i \sin \theta$$

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

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