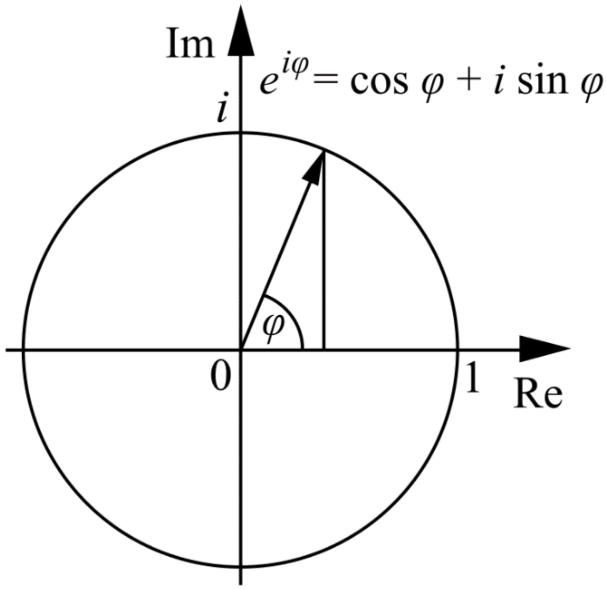

$$
\begin{aligned}
e^{ix} &= 1 + ix + \frac{(ix)^2}{2!} + \frac{(ix)^3}{3!} + \frac{(ix)^4}{4!} + \frac{(ix)^5}{5!} + \frac{(ix)^6}{6!} + \frac{(ix)^7}{7!} + \frac{(ix)^8}{8!} + \cdots \\
&= 1 + ix - \frac{x^2}{2!} - \frac{ix^3}{3!} + \frac{x^4}{4!} + \frac{ix^5}{5!} - \frac{x^6}{6!} - \frac{ix^7}{7!} + \frac{x^8}{8!} + \cdots \\
&= \left(1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \cdots\right) + i\left(x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots\right) \\
&= \cos x + i\sin x.
\end{aligned}
$$

$$cos\,\theta = \frac{a}{r}$$
$$sin\,\theta = \frac{b}{r}$$

$$\theta = a\,cos\,\theta$$
$$\theta = b\,sin\,\theta$$

$z = a + bi$
$z = r\,cos\,\theta + i\,r\,sin\,\theta$
$z = r(cos\,\theta + i\,sin\,\theta)$
$ln(z) = ln(r) + ln(cos\,\theta + i\,sin\,\theta)$
$ln(z) = ln(r) + ln\left(e^{i\theta}\right)$
$ln(z) = ln(r) + i\theta$
$(x + ix_i)^{y+iy_i}$
$= e^{ln(x+ix_i)^{y+iy_i}}$
$= e^{(y+iy_i)\,ln(x+ix_i)}$
$= e^{(y+iy_i)(t+it_i)}$
$= e^{yt+iyt_i+iy_it-y_it_i}$
$= e^{yt-y_it_i+i(yt_i+y_it)}$
$= e^{yt-y_it_i} \cdot e^{i(yt_i+y_it)}$
$= e^{yt-y_it_i}(cos(yt_i + y_it) + i\,sin(yt_i + y_it))$
$= e^{yt-y_it_i}\,cos(yt_i + y_it)$
$+ie^{yt-y_it_i}\,sin(yt_i + y_it)$

$ln(x + ix_i)$
$= ln\sqrt{x^2 + x_i^2} + i\,cos^{-1}\frac{x}{\sqrt{x^2 + x_i^2}}$

$let\ t = ln\sqrt{x^2 + x_i^2}$
$let\ t_i = cos^{-1}\frac{x}{\sqrt{x^2 + x_i^2}}$

$ln\sqrt{x^2 + x_i^2} + i\,cos^{-1}\frac{x}{\sqrt{x^2 + x_i^2}}$

$= t + it_i$