

## Definition III

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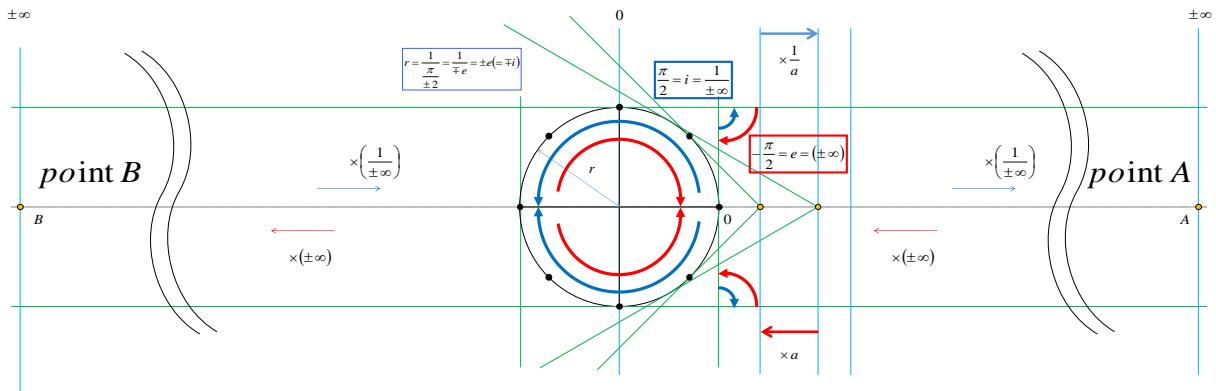
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$$R \times (\pm\infty) = \pm\infty, R + (\pm\infty) = \pm\infty, (-1) \times (\pm\infty) \neq \mp\infty \rightarrow (-1) \times (\pm\infty) = \frac{1}{\pm\infty} \quad \therefore (\pm\infty) \cdot i - 1 = 0$$

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{(\pm\infty)}\right)^{(\pm\infty)} = e \quad \rightarrow \quad \begin{aligned} 1+i &= e^i \left(\because (1+i)^{\frac{1}{i}} = e\right) \\ i &= \log(1+i) \left(\because 1+i = e^i\right) \\ (1+i)^{\pi} &= -1 \left(\because e^{i\pi} = -1\right) \end{aligned} \quad \begin{aligned} (1+i\pi)^{\frac{1}{i}} &= e^{\pi} \left(\because (1+ir)^{\frac{1}{i}} = e^r\right) \\ i\pi &= -2 \\ e &= -i \left(\because e^{-2} = -1, \log i = \frac{1}{2}\pi i = -1\right) \end{aligned}$$

$$\boxed{\text{point } A = \text{point } B}$$



$$\begin{aligned} \textcircled{1} \log\left(-\frac{\pi}{2}\right) &= \log e = 1 \\ \textcircled{2} \log 1 &= \log(-e^2) = 0 \\ \textcircled{3} \log 0 &= \log\left(\frac{1}{\pm\infty}\right) = \log(e^{-1}) = \log(-e) = \log\left(\frac{\pi}{2}\right) = -1 \\ \textcircled{4} \log(-1) &= i\pi = -2 \\ \log(-1) &= \log(e^2) = 2\log e = 2 \quad \boxed{\mp 2 = \pm\infty} \\ \textcircled{5} \log(\mp 2) &= \log(\pm\infty) = \log e = 1 \end{aligned}$$

