

2023-2024

1. $\cos \frac{z-1}{z} = 0$ Laurent

2. $\frac{1}{\sin \frac{1}{1-z}}$

3.
$$I = \int_{|z|=4} \frac{z^5}{(z^2+1)^2(z^2+2)} dz \quad (1)$$

4. $f \in H(\mathbb{D})$ $\ln |f(z)|$

5. $\mathbb{D} \ni f \in H(\mathbb{D})$ $f(0)=1; f(1)=1$ $f(\mathbb{D}) \subset \mathbb{D}$, $|f'(1)| \leq 1$

6. $D = \{z \in \mathbb{C} : |z| < 1, \operatorname{Im} z \geq 0\}$, $f(z) = e^{iz}$, $f(z) \in D$

7. $f(z) = \sum_{n=0}^{\infty} a_n z^n$

(1).
$$\operatorname{Re}(a_0) = \frac{1}{2} \int_0^{2\pi} \operatorname{Re}(f(re^{it})) dt$$

$$a_n = \frac{1}{r^n} \int_0^{2\pi} \operatorname{Re}(f(re^{it})) e^{-in t} dt \quad (2)$$

(2). $\operatorname{Re} f(z) \leq |f(z)|^2$, $f \in H(\mathbb{D})$