

Find all roots in the complex plane $\sqrt[8]{1}$. [99 高師大電子 7]

[解] 設 $z^8 = 1 = e^{i2k\pi} \Rightarrow z = \sqrt[8]{1} = e^{i2k\pi/8}$

$$k=0, z=e^{i0}=1 \quad k=1, z=e^{i\pi/4}=\frac{1}{\sqrt{2}}+i\frac{1}{\sqrt{2}} \quad k=2, z=e^{i\pi/2}=i$$

$$k=3, z=e^{i3\pi/4}=-\frac{1}{\sqrt{2}}+i\frac{1}{\sqrt{2}} \quad k=4, z=e^{i\pi}=-1 \quad k=5, z=e^{i5\pi/4}=-\frac{1}{\sqrt{2}}-i\frac{1}{\sqrt{2}}$$

$$k=6, z=e^{i3\pi/2}=-i \quad k=7, z=e^{i7\pi/4}=\frac{1}{\sqrt{2}}-i\frac{1}{\sqrt{2}}$$

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