EX.1 $z \cdot (z^4 + (1-\sqrt{3})) = 0$

$z = 0$ ∨ $z^4 = \sqrt{3} - 1$

$z^2 = \sqrt{\sqrt{3}-1}$ ∨ $z^2 = -\sqrt{\sqrt{3}-1}$

$z^2 = \sqrt{\sqrt{3}-1} \cdot i^2$

$z = \pm \sqrt[4]{\sqrt{3}-1}$ $z = \pm \sqrt[4]{\sqrt{3}-1} \cdot i$

EX.2 $z_1 = 2 - i$ is a root of $W(z)$ $\Rightarrow$

$\Rightarrow z_2 = \overline{z_1} = 2 + i$ is also a root of $W(z)$

$W(z) = \underbrace{(z-z_1)\cdot(z-z_2)}_{Q(z)} \cdot \underbrace{(z-z_3)(z-z_4)}_{P(z)}$

$Q(z) = z^2 - 4z + 5$

$W(z) : Q(z) = P(z) = z^2 + 5$

$z^2 + 5 = 0$

$z^2 = -5 = 5i^2 \Rightarrow \begin{cases} z_3 = \sqrt{5}\, i \\ z_4 = -\sqrt{5}\, i \end{cases}$

EX.3 $z = i - 1 = -1 + i$

$|z| = \sqrt{2}$ $\varphi = \arg z = \frac{3}{4}\pi$

$\sqrt[3]{z} = \{z_0, z_1, z_2\} = ?$

$z_0 = \sqrt[3]{\sqrt{2}} \cdot \left(\cos \frac{\frac{3}{4}\pi + 0}{3} + i \cdot \sin \frac{\frac{3}{4}\pi + 0}{3}\right) =$

$= \sqrt[6]{2} \cdot \left(\cos \frac{\pi}{4} + i \cdot \sin \frac{\pi}{4}\right) = \sqrt[6]{2} \cdot \left(\frac{\sqrt{2}}{2} + i \cdot \frac{\sqrt{2}}{2}\right)$

$z_1 = \sqrt[3]{\sqrt{2}} \cdot \left(\cos \frac{\frac{3}{4}\pi + 2\pi}{3} + i \cdot \sin \frac{\frac{3}{4}\pi + 2\pi}{3}\right) = \sqrt[6]{2} \cdot \left(\cos \frac{11}{12}\pi + i \cdot \sin \frac{11}{12}\pi\right)$

$z_2 = \sqrt[3]{\sqrt{2}} \cdot \left(\cos \frac{\frac{3}{4}\pi + 4\pi}{3} + i \cdot \sin \frac{\frac{3}{4}\pi + 4\pi}{3}\right) = \sqrt[6]{2} \cdot \left(\cos \frac{19}{12}\pi + i \cdot \sin \frac{19}{12}\pi\right)$

EX.4 $3z^3 + 6z^2 + 2z + 4 = 0$

$3z^2 \cdot (z+2) + 2 \cdot (z+2) = 0$

$(z+2) \cdot (3z^2 + 2) = 0$

$z + 2 = 0$ ∨ $3z^2 + 2 = 0$

$z = -2$ ∨ $z^2 = -\frac{2}{3}$

$z^2 = \frac{2}{3} \cdot i^2$

$z = \pm \sqrt{\frac{2}{3}} \cdot i$