1.10.) $v = \frac{1}{2}(1 + \sqrt{3}\,i) = \frac{1}{2} + \frac{\sqrt{3}}{2}\,i$

a) $|v| = \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2} = \sqrt{\frac{1}{4} + \frac{3}{4}} = \sqrt{1} = 1$

$v^2 = \left(\frac{1}{2} + \frac{\sqrt{3}}{2}\,i\right)^2 = \left(\frac{1}{2}\right)^2 + 2 \cdot \left(\frac{1}{2}\right) \cdot \left(\frac{\sqrt{3}}{2}\,i\right) + \left(\frac{\sqrt{3}}{2}\,i\right)^2 = \frac{1}{4} + \frac{\sqrt{3}}{2}\,i + \frac{3}{4}(-1)$

$= \frac{1}{4} - \frac{3}{4} + \frac{\sqrt{3}}{2}\,i = -\frac{1}{2} + \frac{\sqrt{3}}{2}\,i$

$v^3 = \left(\frac{1}{2} + \frac{\sqrt{3}}{2}\,i\right)^3 = \left(\frac{1}{2}\right)^3 + 3 \cdot \left(\frac{1}{2}\right)^2 \frac{\sqrt{3}}{2}\,i + 3 \cdot \left(\frac{1}{2}\right) \cdot \left(\frac{\sqrt{3}}{2}\,i\right)^2 + \left(\frac{\sqrt{3}}{2}\,i\right)^3$

$= \frac{1}{8} + 3 \cdot \left(\frac{1}{4}\right) \frac{\sqrt{3}}{2}\,i + 3 \cdot \frac{1}{2} \cdot \frac{3}{4}(-1) + \frac{3 \cdot \sqrt{3}}{8}(-i)$

$= \frac{1}{8} + \frac{3 \cdot \sqrt{3}}{4 \cdot 2}\,i - \frac{3 \cdot 3}{2 \cdot 4} - \frac{3 \cdot \sqrt{3}}{8}\,i = \frac{1}{8} - \frac{9}{8} = -\frac{8}{8} = -1$

1.10.9... $\{1+0i,\ \frac{1}{2}+\frac{\sqrt{3}}{2}i,\ -\frac{1}{2}+\frac{\sqrt{3}}{2}i,\ -1+0i,\ -\frac{1}{2}-\frac{\sqrt{3}}{2}i,\ \frac{1}{2}-\frac{\sqrt{3}}{2}i\}$

$n\%6=0$ $n\%6=1$ $n\%6=2$ $n\%6=3$ $n\%6=4$ $n\%6=5$

b) $1+0i$: $\sqrt{1^2+0^2}=\sqrt{1}=1$ $\frac{1}{2}+\frac{\sqrt{3}}{2}i$: 1 siehe oben

$-\frac{1}{2}+\frac{\sqrt{3}}{2}i$: $\sqrt{(-\frac{1}{2})^2+(\frac{\sqrt{3}}{2})^2}=\sqrt{\frac{1}{4}+\frac{3}{4}}=\sqrt{1}=1$ $-1+0i$: $\sqrt{(-1)^2+0^2}=\sqrt{1}=1$

$-\frac{1}{2}-\frac{\sqrt{3}}{2}i$: $\sqrt{(-\frac{1}{2})^2+(-\frac{\sqrt{3}}{2})^2}=\sqrt{\frac{1}{4}+\frac{3}{4}}=\sqrt{1}=1$ $\frac{1}{2}-\frac{\sqrt{3}}{2}i$: $\sqrt{(\frac{1}{2})^2+(-\frac{\sqrt{3}}{2})^2}=\sqrt{\frac{1}{4}+\frac{3}{4}}=1$