Liceo Scientifico Statale M.Grigoletti, Pordenone

Modulo CLIL sui Numeri Complessi

Calculation of roots - Lessons 7 and 8

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1. $\sqrt{1} = \sqrt{[1, 0°]} = \left\{ \left[1, \frac{0°}{2}\right], \left[1, \frac{360°}{2}\right] \right\} = \{1, -1\}$, as with real numbers.
2. $\sqrt[3]{1} = \sqrt[3]{[1, 0°]} = \left\{ \left[1, \frac{0°}{3}\right], \left[1, \frac{360°}{3}\right], \left[1, \frac{720°}{3}\right] \right\} = \left\{1, -\frac{1}{2} + i\frac{\sqrt{3}}{2}, -\frac{1}{2} - i\frac{\sqrt{3}}{2}\right\}.$
3. $\sqrt{i} = \sqrt{[1, 90°]} = \left\{ \left[1, \frac{90°}{2}\right], \left[1, \frac{90°+360°}{2}\right] \right\} = \left\{ \frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2} \right\}$
4. $\sqrt[3]{-2+2i} = \sqrt[3]{\left[\sqrt{8}, 135°\right]} = \left\{ \left[\sqrt[6]{8}, 45°\right], \left[\sqrt[6]{8}, 165°\right], \left[\sqrt[6]{8}, 285°\right] \right\}$
5. $\sqrt[4]{1} = \cdots = \{1, -1, i, -i\}$
6. $\begin{aligned} \sqrt[6]{(\sqrt{3}+i)^9} &= \sqrt[6]{[2, 30°]^9} = \sqrt[6]{[2^9, 270°]} = \left\{ \left[2\sqrt{2}, \frac{270° + k \cdot 360°}{6}\right], k = 0, 1, 2, 3, 4, 5 \right\} \\ &= \{2 + 2i, \cdots\} \end{aligned}$