

Trigonometric form of roots of the equation: $x^{263} - 4\sqrt{3}\iota - 4 = 0$

$$x^{263} - 4\sqrt{3}\iota - 4 = 0$$

$$x^{263} = 4 + 4\sqrt{3}\iota = z$$

$$x = \sqrt[263]{z}$$

$$|z| = \sqrt{Re(z)^2 + Im(z)^2}$$

$$z = |z| \left(\frac{Re(z)}{|z|} + \frac{Im(z)}{|z|} \iota \right) = |z| (\cos \varphi + \iota \sin \varphi)$$

$$\sqrt[n]{z} = |z|^{\frac{1}{n}} \left(\cos \frac{\varphi + 2k\pi}{n} + \iota \sin \frac{\varphi + 2k\pi}{n} \right)$$

$$k = 0, 1, \dots, n - 1$$

$$|z| = \sqrt{(4)^2 + (4\sqrt{3})^2} = \sqrt{16 + 16 \times 3} = \sqrt{4 \times 16} = 2 \times 4 = 8$$

$$z = 8 \left(\frac{4}{8} + \frac{4\sqrt{3}}{8} \iota \right) = 8 \left(\frac{1}{2} + \iota \frac{\sqrt{3}}{2} \right) = 8 \left(\cos \frac{\pi}{3} + \iota \sin \frac{\pi}{3} \right)$$

$$x = \sqrt[263]{z} = 2^{\frac{3}{263}} \left(\cos \frac{\frac{\pi}{3} + 2k\pi}{263} + \iota \sin \frac{\frac{\pi}{3} + 2k\pi}{263} \right)$$

$$k = 0, 1, \dots, 262$$