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

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

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

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

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

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

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

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

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

$$x = \sqrt[263]{z} = 2^{\frac{3}{263}}\left(\cos\frac{\pi}{789} + \imath\sin\frac{\pi}{789}\right)$$

$$x_k = 2^{\frac{3}{263}}\left(\cos\left(\frac{\pi}{789} + 2k\pi\right) + \imath\sin\left(\frac{\pi}{789} + 2k\pi\right)\right)$$