$(x-\imath)^{36}+(x+\imath)^{36}=0$
$(x-\imath)^{36}=-(x+\imath)^{36}$
$x\neq\imath$
$\left(\frac{x-\imath}{x+\imath}\right)^{36}=-1$
$A=\frac{x-\imath}{x+\imath}$
$A^{36}=-1$
$z=-1=-1+0\imath$
$|z|=\sqrt{1}=1$
$\cos\varphi=\frac{-1}{1}=-1,\sin\varphi=\frac{0}{1}=0\implies\varphi=\pi$
$z=\cos\pi+\imath\sin\pi$
$\sqrt[36]{z}=\cos\frac{\pi+2k\pi}{36}+\imath\sin\frac{\pi+2k\pi}{36}=z_k$
$k=0,1,\ldots,35$
$\frac{x-\imath}{x+\imath}=z_k$
$x-\imath=z_k(x+\imath)$
$x-\imath=z_kx+z_k\imath$
$\imath-z_k\imath=z_kx+x$
$(1-z_k)\imath=(z_k+1)x$
$z_k<\cos\frac{\pi+2\pi\cancel{36}}{\cancel{36}}+\imath\sin\frac{\pi+2\pi\cancel{36}}{\cancel{36}}=\cos\pi+\imath\sin\pi=-1$
$\implies z_k+1\neq0$
$x=\frac{(z_k-1)\imath}{(z_k+1)}$