QUESTION

Using de Moivre's theorem, or otherwise, calculate $\left(\cos\left(\frac{\pi}{4}\right) + j\sin\left(\frac{\pi}{4}\right)\right)^4$.

ANSWER

$\left(\cos\left(\frac{\pi}{4}\right) + j\sin\left(\frac{\pi}{4}\right)\right)^4 = \cos(\pi) + j\sin(\pi) = -1 + j(0) = -1$