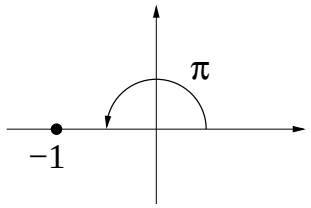
QUESTION

Write -1 in complex exponential form and hence, or otherwise, find all values of $\ln(-1)$.

ANSWER



For $z = -1, r = 1, \theta = \pi + 2n\pi$
So $-1 = 1e^{j(\pi+2n\pi)},\ n = 0, \pm1, \pm2, \ldots$
Therefore $\ln(-1) = \ln\{1e^{j(\pi+2n\pi)}\} = \ln 1 + \ln\{e^{j(\pi+2n\pi)}\}$
i.e. $\ln(-1) = j(\pi + 2n\pi),\ n$ any integer.