PROBLEM:

Simplify the following complex-valued expressions:

(a) Solve $e^{j\theta} = j$, for θ. Give the answer in degrees and radians.

(b) Evaluate j^j, giving the answer in Cartesian form.

SOLUTION

Simplify the following complex-valued expressions:

(a) Solve $e^{j\theta} = j$, for θ. Give the answer in degrees and radians.

$$j = e^{j\pi/2} \qquad \therefore \qquad \theta = \frac{\pi}{2} + 2\pi\ell.$$

(b) Evaluate j^j, giving the answer in Cartesian form.

$$j^j = \left(e^{j\pi/2}\right)^j = e^{-\pi/2} = e^{-1.57} = 0.208$$