

PROBLEM:

Simplify the following complex-valued expressions. Draw a vector diagram for these expressions. Give the answers in *both* Cartesian and polar form.

(a) $e^{j\pi/4} + e^{j3\pi/4}$, evaluate the sum.

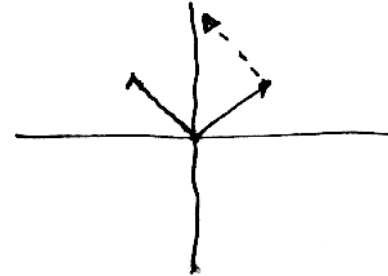
(b) $e^{j\pi/3} (e^{j\pi/2} + e^{j\pi})$, evaluate the expression.



Simplify the following complex-valued expressions. Draw a vector diagram for these expressions. Give the answers in *both* Cartesian and polar form.

(a) $e^{j\pi/4} + e^{j3\pi/4}$, evaluate the sum.

$$\text{ANS} = \sqrt{2}j = \sqrt{2} e^{j\pi/2}$$



(b) $e^{j\pi/3} (e^{j\pi/2} + e^{j\pi})$, evaluate the expression.

$$\begin{aligned} &= e^{j\pi/3} (\sqrt{2} e^{j3\pi/4}) \\ &= \sqrt{2} e^{j13\pi/12} = \sqrt{2} \angle 195^\circ \\ &= -1.366 - j0.366 \end{aligned}$$

$$\begin{aligned} \frac{\pi}{3} + \frac{3\pi}{4} &= \frac{13\pi}{12} \\ &= 195^\circ \end{aligned}$$

