



## PROBLEM:

Simplify the following complex-valued expressions: Give the answer in *either* Cartesian or polar form, whichever is most convenient.

(a)  $z = 11e^{j\pi/5}$ , evaluate the conjugate,  $z^*$ .

(b)  $z = 3e^{-j6\pi/5}$ , evaluate  $1/z$ .

(c)  $z = 7e^{-j9\pi/11}$ , evaluate  $|z|^2$ .

(d)  $z = 17e^{j11\pi/6}$ , evaluate  $\Im\{z\}$ .



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(a)  $z = 11e^{j\pi/5}$ , evaluate the conjugate,  $z^*$ .

$$z^* = 11e^{-j\pi/5} \quad \text{or} \quad z^* = 8.899 - j6.466$$

$\uparrow$   
 $-36^\circ$

(b)  $z = 3e^{-j6\pi/5}$ , evaluate  $1/z$ .

$$\frac{1}{z} = \frac{1}{3}e^{+j6\pi/5} \quad \text{or} \quad \frac{1}{z} = -0.2697 - j0.196$$

$\uparrow$   
 $216^\circ$

(c)  $z = 7e^{-j9\pi/11}$ , evaluate  $|z|^2$ .

$$|z|^2 = 49$$

(d)  $z = 17e^{j11\pi/6}$ , evaluate  $\Im\{z\}$ .

$$\Im\{z\} = 17 \sin(11\pi/6) = 17 \sin 330^\circ = -8.5$$