



1. Give numerical answers to each of the following questions:
  - a) Find the value of  $z = 6 - j5 + -3 + j3$ .
  - b) Find the magnitude of  $z = 5 + j12$ .
  - c) Find the conjugate of  $z = \frac{2 + j2}{-j}$ .
  - d) Find the real part of  $z = e^{j\pi/2}$ .
  - e) Find the value of  $z = (6 - j5)(-3 + j3)$ .
  
2. Plot each of the following complex numbers as vectors in the complex plane:
  - a)  $j$
  - b)  $e^{j\pi/2}$
  - c)  $\frac{1+j}{2} - \frac{1-j}{2}$
  - d)  $\frac{1}{j^3}$
  - e)  $\frac{1+j}{1-j}$
  
3. Give numerical answers to each of the following questions:
  - a) Rationalize  $\frac{175 - j600}{-3 + j4}$ . Express your answer in rectangular form.
  - b) Find the polar form of  $\frac{1}{2} + j\frac{\sqrt{3}}{2}$ .
  - c) Find the rectangular form of  $5\angle 25^\circ \cdot 8\angle 35^\circ$
  - d) Find the magnitude of  $\left( \frac{j^3}{2 + j4} \right) \left( \frac{30e^{j129^\circ}}{2 - j} \right)$ .
  - e) Find the real part of  $\frac{(1+j)^4}{1 + j\sqrt{3}}$ .

4. Write phasors (as both  $Ae^{j\phi}$  and  $A\angle\phi$ ) for each of the following signals:

a)  $v(t) = 4 \cos(100t + 30^\circ)$  V

b)  $i(t) = 7 \sin(\omega t - 45^\circ)$  mA

c)  $i(t) = 50 \text{ nF} \cdot \frac{d}{dt} 4 \cos(100t + 30^\circ)$  V

d)  $v(t) = 17 \text{ } \mu\text{H} \cdot \frac{d}{dt} 7 \sin(60t - 45^\circ)$  mA

e)  $v(t) = 4 \cos(100t + 30^\circ)$  V +  $3 \sin(100t - 150^\circ)$  V

5. Given  $\omega = 200$  rad/sec, write inverse phasors for each of the following signals:

a)  $\mathbf{I} = 6e^{j45^\circ}$  A

b)  $\mathbf{V} = j9$  V

c)  $\mathbf{I} = -2$  A

d)  $\mathbf{V} = 6(1 + j)e^{j45^\circ}$  V

e)  $\mathbf{I} = e^{3+j45^\circ}$  A =  $e^3 \angle 45^\circ$  A