1. a) Find the real part of $z = e^{j\pi/2}$.
   b) Find the rectangular form of $e^{j\pi/2}$.
   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 polar (magnitude and angle) form of $\sqrt{2+\sqrt{3}} - j\sqrt{2-\sqrt{3}}$

2. Given $\omega = 10k \text{ rad/s}$, for each of the following impedances, determine which of the following the impedance is from: a capacitor, an inductor, or a resistor. Also, find the value of that capacitor, inductor, or resistor. Recall that $z_R = R$, $z_L = j\omega L$, and $z_C = 1/j\omega C$.
   a) 1 kΩ
   b) $-j50$ Ω
   c) $j400$ Ω
   d) $-j2$ kΩ
   e) $j8$ kΩ

3. Derive a symbolic expression for the impedance of an $R$, an $L$, and a $C$ in parallel at frequency $\omega$. Rationalize the expression so the denominator is real.

4. Write phasors (in both $Ae^{j\phi}$ and $A\angle \phi$ notations) 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) $v(t) = 17 \text{ µH} \cdot \frac{d}{dt} 7 \sin(60t - 45^\circ)$ 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) $I = 6e^{j45^\circ} \text{ A}$

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

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

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

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