Chris Hunt HW2 ENGR 202

2.1) a) $\frac{25}{-5+j10} + \frac{6\angle -25^\circ}{(2+j1)(3+j4)} \rightarrow \frac{25\angle 0}{5\sqrt{5}\angle 116.57} + \frac{6\angle -25}{(\sqrt{5}\angle 26.57)(5\angle 53.13)}$

$\sqrt{5}\angle -116.57 + \frac{6\angle -25}{5\sqrt{5}\angle 79.7} \rightarrow \sqrt{5}\angle -116.57 + \frac{6}{5\sqrt{5}}\angle -104.7$

$-1 - j2 - .14 - j.52 \rightarrow -1.14 - j2.52 \rightarrow \boxed{2.77\angle -114.34}$

b) $16 + (4\angle 60)(5+j10) \rightarrow 16 + (4\angle 60)(5\sqrt{5}\angle 63.43)$

$16 + 20\sqrt{5}\angle 123.43 \rightarrow 16 - 24.64 + j37.32 \rightarrow -8.64 + j37.32$

$\boxed{38.31\angle 103}$

2.2) a) $V_1(t) = 10\cos(10t - 25^\circ)\,V \xrightarrow{P} \boxed{10\angle -25\,V}$

b) $i_1(t) = 2\sin(10t + 60)\,mA \rightarrow 2\cos(10t + 60 - 90)\,mA \xrightarrow{P} \boxed{2\angle -30\,mA}$

c) $V_2(t) = 220\sin(10t - 30^\circ)\,V \rightarrow 220\cos(10t - 30 - 90)\,V \xrightarrow{P} \boxed{220\angle -120\,V}$

d) $i_2(t) = -1\cos(10t + 10^\circ)\,A \rightarrow 1\cos(10t + 10^\circ - 180^\circ)\,A \xrightarrow{P} \boxed{1\angle -170^\circ}$

2.3) a) $60\angle 15^\circ,\ \omega = 377\ rad/s \xrightarrow{P^{-1}} \boxed{v(t) = 60\cos(377t + 15^\circ)\,V}$

b) $3 + j4\,A,\ \omega = 10\ rad/s$

$5\angle 53.13^\circ A \xrightarrow{P^{-1}} \boxed{i(t) = 5\cos(10t + 53.13^\circ)\,A}$

c) $10e^{j\pi/2}\,V,\ \omega = 1000\ rad/s$

$10\angle \pi/2\,V \rightarrow \boxed{v(t) = 10\cos\left(1000t + \frac{\pi}{2}\right)V}$

d) $.1 - j.3A,\ \omega = 400\ rad/s$

$.32\angle -71.6^\circ \rightarrow \boxed{i(t) = .32\cos(400t - 71.6^\circ)\,A}$