Chapter 9, Solution 23.

(a) $v = [110\sin(20t+30^\circ) + 220\cos(20t-90^\circ)]$ V leads to $\mathbf{V} = 110\angle(30^\circ-90^\circ) + 220\angle-90^\circ = 55-j95.26 - j220 = 55-j315.3 = 320.1\angle-80.11^\circ$ or

$$v = \mathbf{320.1\cos(20t-80.11^\circ)\ A}.$$

(b) $i = [30\cos(5t+60^\circ)-20\sin(5t+60^\circ)]$ A leads to $\mathbf{I} = 30\angle60^\circ - 20\angle(60^\circ-90^\circ) = 15+j25.98 - (17.321-j10) = -2.321+j35.98 = 36.05\angle93.69^\circ$ or

$$i = \mathbf{36.05\cos(5t+93.69^\circ)\ A}.$$

(a) 320.1cos(20t–80.11°) A, (b) 36.05cos(5t+93.69°) A