

### Chapter 9, Solution 44.

Calculate  $i(t)$  in the circuit of Fig. 9.51.



Figure 9.51  
For Prob. 9.44.

### Solution

$$\omega = 200$$

$$10 \text{ mH} \longrightarrow j\omega L = j(200)(10 \times 10^{-3}) = j2$$

$$5 \text{ mF} \longrightarrow \frac{1}{j\omega C} = \frac{1}{j(200)(5 \times 10^{-3})} = -j$$

$$\mathbf{Y} = \frac{1}{4} + \frac{1}{j2} + \frac{1}{3-j} = 0.25 - j0.5 + \frac{3+j}{10} = 0.55 - j0.4$$

$$\mathbf{Z} = \frac{1}{\mathbf{Y}} = \frac{1}{0.55 - j0.4} = 1.1892 + j0.865$$

$$\mathbf{I} = \frac{6 \angle 0^\circ}{5 + \mathbf{Z}} = \frac{6 \angle 0^\circ}{6.1892 + j0.865} = 0.96 \angle -7.956^\circ$$

Thus,

$$i(t) = 960 \cos(200t - 7.956^\circ) \text{ mA}$$