

**Chapter 6, Solution 4.**

A current of  $4 \sin(4t)$  A flows through a 5-F capacitor. Find the voltage  $v(t)$  across the capacitor given that  $v(0) = 1$  V.

**Solution**

$$v = \frac{1}{C} \int_0^t i dt + v(0)$$

$$= \frac{1}{5} \int_0^t 4 \sin(4t) dt + 1 = \left( -\frac{0.8}{4} \cos(4t) \right) \bigg|_0^t + 1 = -0.2 \cos(4t) + 0.2 + 1$$

$$= [1.2 - 0.2 \cos(4t)] \text{ V.}$$