C9 problems

Practice Problem 9.2

Find the phase angle between

$$i_1 = -4 \sin(377t + 55°) \quad \text{and} \quad i_2 = 5 \cos(377t - 65°)$$

Does i_1 lead or lag i_2?

Answer: $210°$, i_1 leads i_2.

Practice Problem 9.4

Express these sinusoids as phasors:

(a) $v = 7 \cos(2t + 40°)$ V

(b) $i = -4 \sin(10t + 10°)$ A

Answer: (a) $\mathbf{V} = 7\underline{/40°}$ V, (b) $\mathbf{I} = 4\underline{/100°}$ A.

Practice Problem 9.6

If $v_1 = -10 \sin(\omega t - 30°)$ V and $v_2 = 20 \cos(\omega t + 45°)$ V, find $v = v_1 + v_2$.

Answer: $v(t) = 29.77 \cos(\omega t + 49.98°)$ V.

Practice Problem 9.8

If voltage $v = 10 \cos(100t + 30°)$ is applied to a 50 μF capacitor, calculate the current through the capacitor.

Answer: $50 \cos(100t + 120°)$ mA.

Refer to Fig. 9.17. Determine $v(t)$ and $i(t)$.

Answer: $8.944 \sin(10t + 93.43°)$ V, $4.472 \sin(10t + 3.43°)$ A.

$v_s = 20 \sin(10t + 30°)$ V
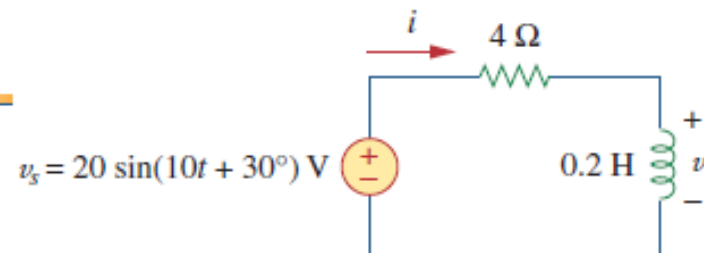
Figure 9.17
For Practice Prob. 9.9.

Practice Problem 9.12

Find **I** in the circuit of Fig. 9.30.

Answer: $9.546\underline{/33.8°}$ A.

Figure 9.30
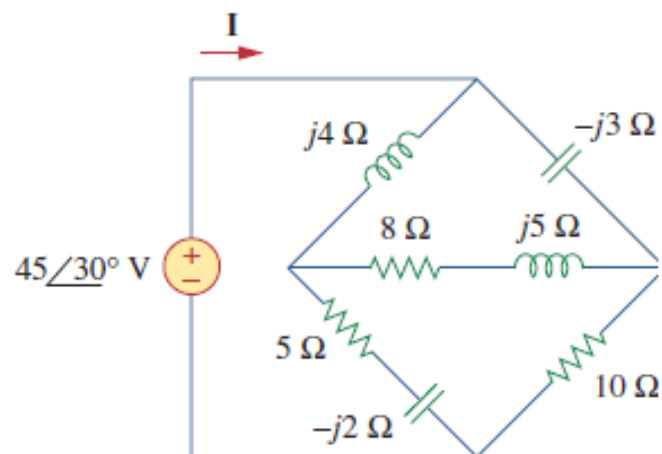For Practice Prob. 9.12.
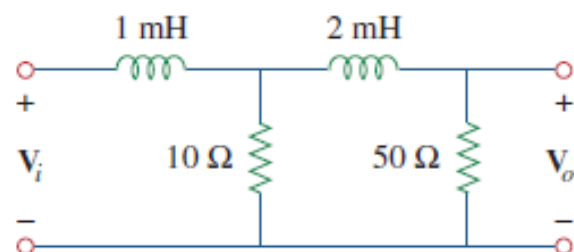
Practice Problem 9.14

Figure 9.36
For Practice Prob. 9.14.

Refer to the *RL* circuit in Fig. 9.36. If 10 V is applied to the input, find the magnitude and the phase shift produced at 5 kHz. Specify whether the phase shift is leading or lagging.

Answer: 1.7161 V, 120.39°, lagging.

- 9.2 (s9.2)
- 9.4 (s9.3)
- 9.6 (s9.3)
- 9.8 (s9.4)
- 9.9 (s9.5)
- 9.12 (s9.7)
- 9.14 (s9.8)