Problem 1

Find the phasor form of the following functions:

a. $v(t) = 155\cos(377t - 25^\circ)\,\text{V}$

b. $v(t) = 5\sin(1000t - 40^\circ)\,\text{V}$

c. $i(t) = 10\cos(10t + 63^\circ) + 15\cos(10t - 42^\circ)\,\text{A}$

d. $i(t) = 460\cos(500\pi t - 25^\circ) - 220\sin(500\pi t + 15^\circ)\,\text{A}$

Problem 2

Convert the following complex numbers to polar form:

a. $4 + j4$

b. $-3 + j4$

c. $j + 2 - j4 - 3$

Problem 3

Convert the following to polar form and compute the product. Compare the result with that obtained using rectangular form.

a. $(50 + j10)(4 + j8)$

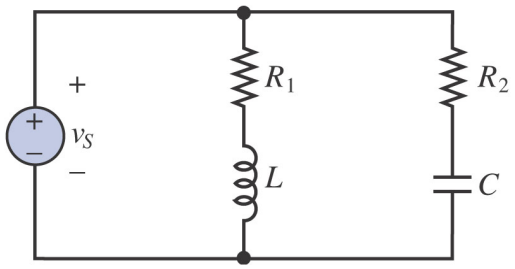
b. $(j2 - 2)(4 + j5)(2 + j7)$

Problem 4

Determine the equivalent impedance in the circuit shown below.

$$v_s(t) = 7\cos\left(3{,}000t + \frac{\pi}{6}\right)\text{V}$$

$R_1 = 2.3\ \text{k}\Omega$, $R_2 = 1.1\ \text{k}\Omega$, $L = 190\ \text{mH}$, and $C = 55\ \text{nF}$.



Problem 5

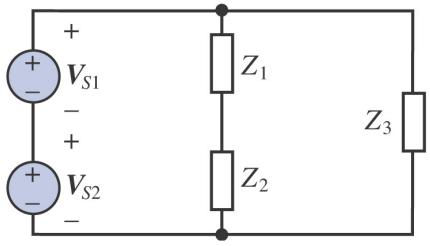
Determine the current through Z_3 in the circuit below.

$v_{s1} = v_{s2} = 170\cos(377t)$ V

$Z_1 = 5.9\angle 0.122\ \Omega$

$Z_2 = 2.3\angle 0\ \Omega$

$Z_3 = 17\angle 0.192\ \Omega$

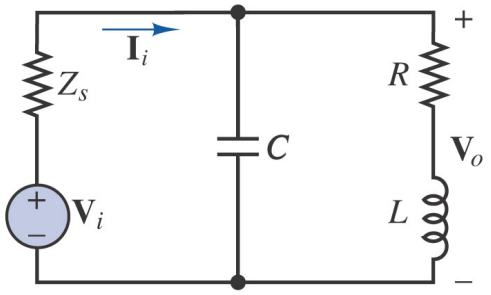


Problem 6

Determine the frequency so that the current I_i and voltage V_o in the circuit below are in phase.

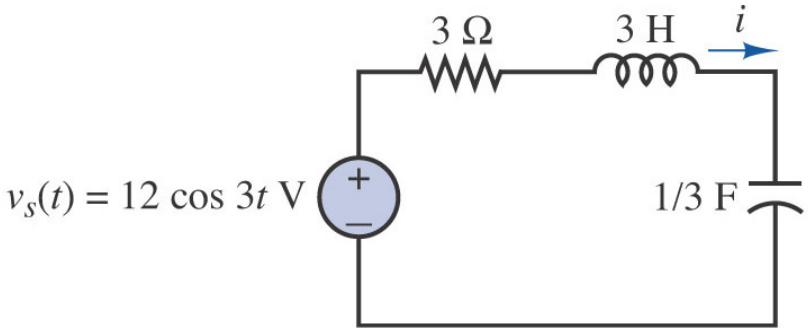
$Z_s = 13{,}000 + j\omega 3\ \Omega$

$R = 120\ \Omega$, $L = 19$ mH, and $C = 220$ pF

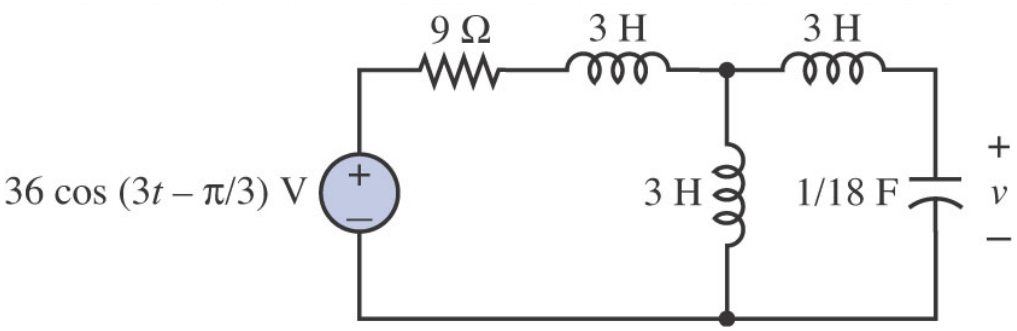


Problem 7

Use phasor techniques, solve for the current in the circuit below.



Problem 8
Use phasor techniques, solve for v in the circuit below



Problem 9
Use the phasor techniques, solve for i in the circuit below.