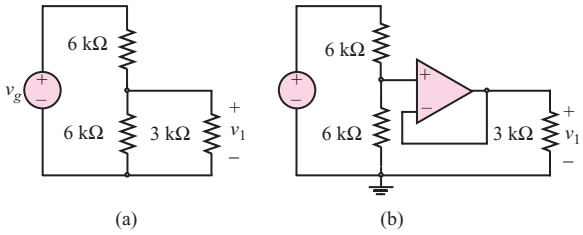

Figure P8.5

8.6 Find the current i in the circuit of Figure P8.6.

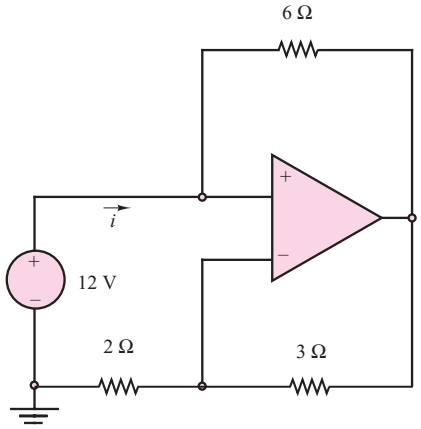

Figure P8.6

8.7 Find the voltage v_o in the circuit of Figure P8.7.

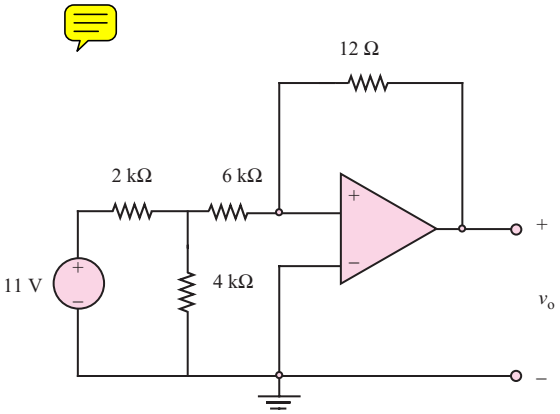

Figure P8.7

8.8 Show that the circuit of Figure P8.8 is a noninverting summing amplifier.

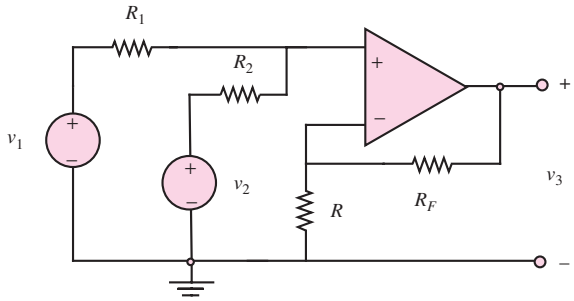

Figure P8.8

8.9 Determine an expression for the overall gain $A_v = v_o/v_i$ for the circuit of Figure P8.9. Find the input conductance, $G_{in} = i_i/v_i$ seen by the voltage source v_i. Assume that the op-amp is ideal.

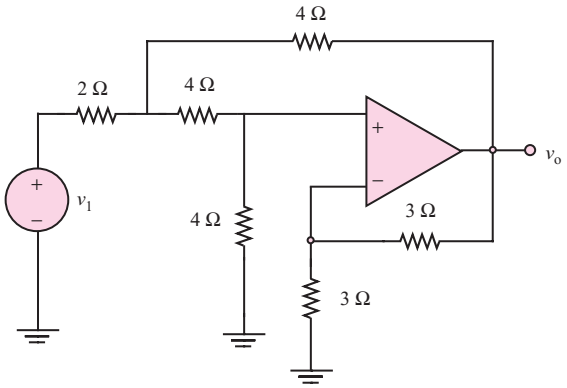

Figure P8.9

8.10 Differential amplifiers are often used in conjunction with Wheatstone bridge circuits. Consider the bridge shown in Figure P8.10, where each resistor is a temperature sensing element, and its change in resistance is directly proportion to a change in temperature—that is, $\Delta R = \alpha(\pm\Delta T)$, where the sign is determined by the positive or negative temperature coefficient of the resistive element.

a. Find the Thévenin equivalent that the amplifier sees at point a and at point b. Assume that $|\Delta R|^2 \ll R_0$.

b. If $|\Delta R| = K\,\Delta T$, with K a numerical constant, find an expression for v_{out} (ΔT), that is, for v_{out} as a function of the change in temperature.

8.11 The circuit shown in Figure P8.11 is called a *negative impedance converter*. Determine the impedance looking in:

$Z_{in} = \frac{V_1}{I_1}$, if

a. $Z_L = R$ and if

b. $Z_L = \frac{1}{j\omega C}$.