4.24 Show that the output of the circuit in Fig. P4.24 is

$$V_o = \left[1 + \frac{R_2}{R_1}\right]V_1 - \frac{R_2}{R_1}V_2$$

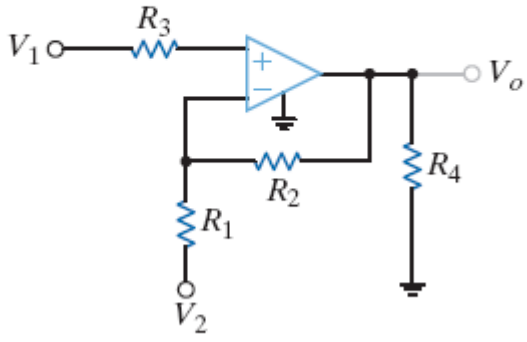
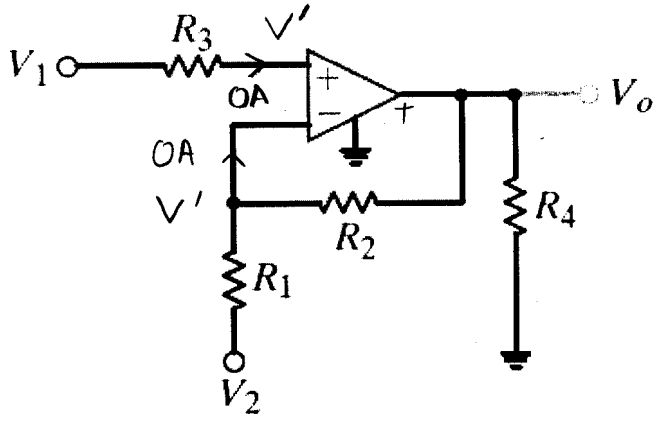


Figure P4.24

SOLUTION:

$$V_0 = \left[1 + \frac{R_2}{R_1}\right]V_1 - \frac{R_2}{R_1}V_2$$



KCL at V_+ : $\frac{V_1 - V'}{R_3} = 0$

$$V_1 = V'$$

$$\frac{V_2 - V'}{R_1} + \frac{V_0 - V'}{R_2} = 0$$

$$V_0 = V' + \frac{R_2}{R_1}V' - \frac{R_2}{R_1}V_2$$

$$V_o = \left(1 + \frac{R_2}{R_1}\right) V' - \frac{R_2}{R_1} V_2$$

$$V' = V_1$$

$$V_o = \left(1 + \frac{R_2}{R_1}\right) V_1 - \frac{R_2}{R_1} V_2$$