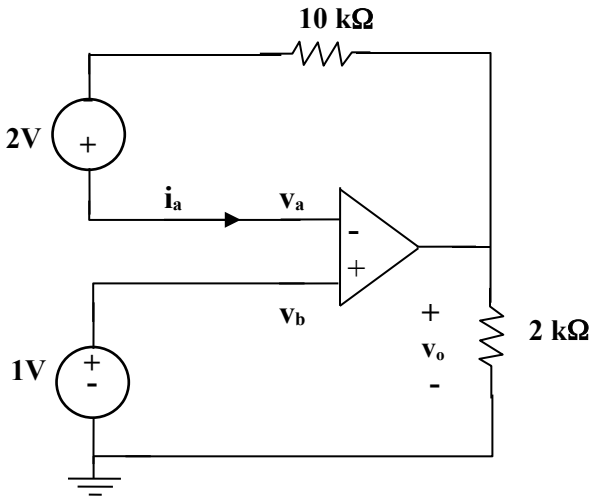
Chapter 5, Solution 8.

(a) If v_a and v_b are the voltages at the inverting and noninverting terminals of the op amp.

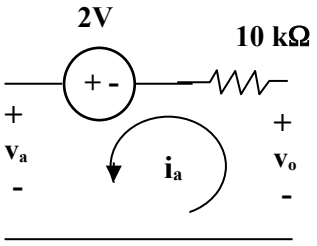
$v_a = v_b = 0$

$$1\text{mA} = \frac{0 - v_0}{2\text{k}} \longrightarrow v_0 = \mathbf{-2\ V}$$

(b)



(a)



(b)

Since $v_a = v_b = 1\text{V}$ and $i_a = 0$, no current flows through the 10 kΩ resistor. From Fig. (b),

$$-v_a + 2 + v_0 = 0 \longrightarrow v_0 = v_a - 2 = 1 - 2 = \mathbf{-1V}$$