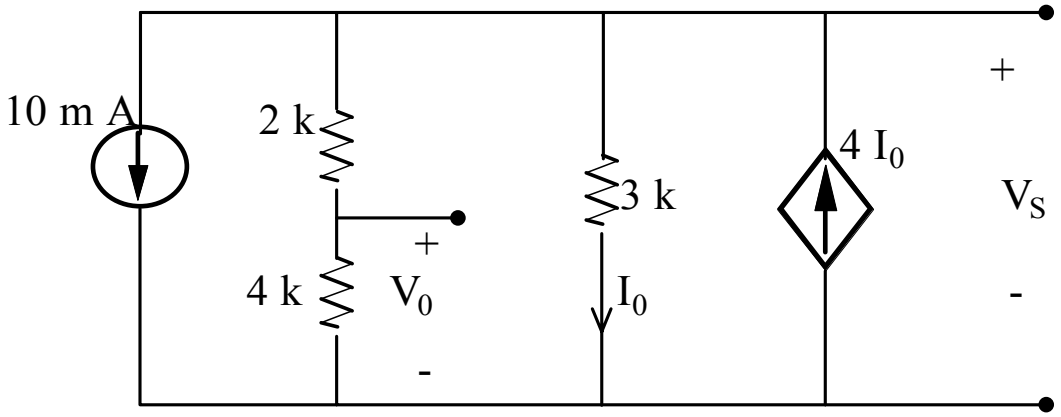
Example:

Find V_0 using KCL:



$$10\ \text{m} + \frac{V_s}{6\ \text{k}} + \frac{V_s}{3\ \text{k}} - 4\left(\frac{V_s}{3\ \text{k}}\right) = 0$$

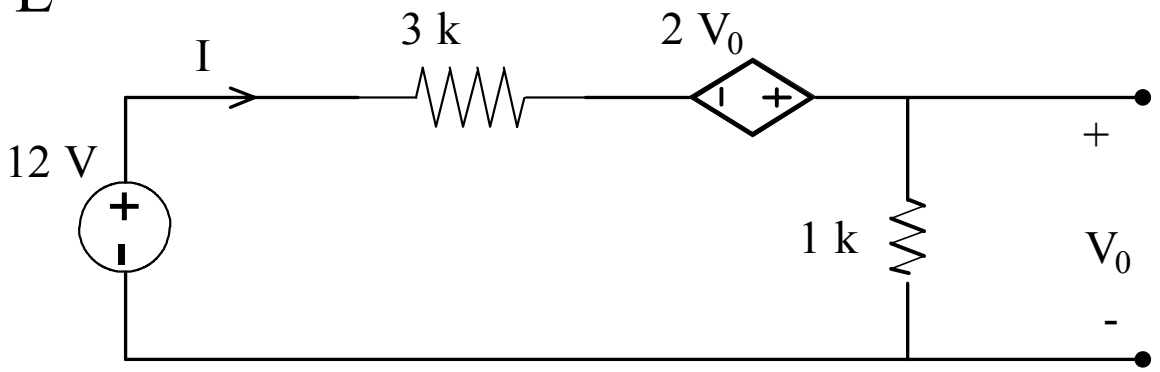
$$V_s\left[\frac{1}{6\ \text{k}} + \frac{1}{3\ \text{k}} - \frac{4}{3\ \text{k}}\right] = -10\ \text{m A}$$

$$V_s = 12\ \text{V}$$

$$V_0 = \frac{4\ \text{k}}{2\ \text{k} + 4\ \text{k}} V_s = \frac{2}{3}(12) = 8\ \text{V}$$

Example:

Find V_0 using KVL



$$-12+(3\text{k})\,\text{I}-2\,\text{V}_0+\text{V}_0=0$$

$$-\text{V}_0+(3\text{k})\,\text{I}-12=0$$

$$\text{I}=\frac{\text{V}_0}{1\text{k}}$$

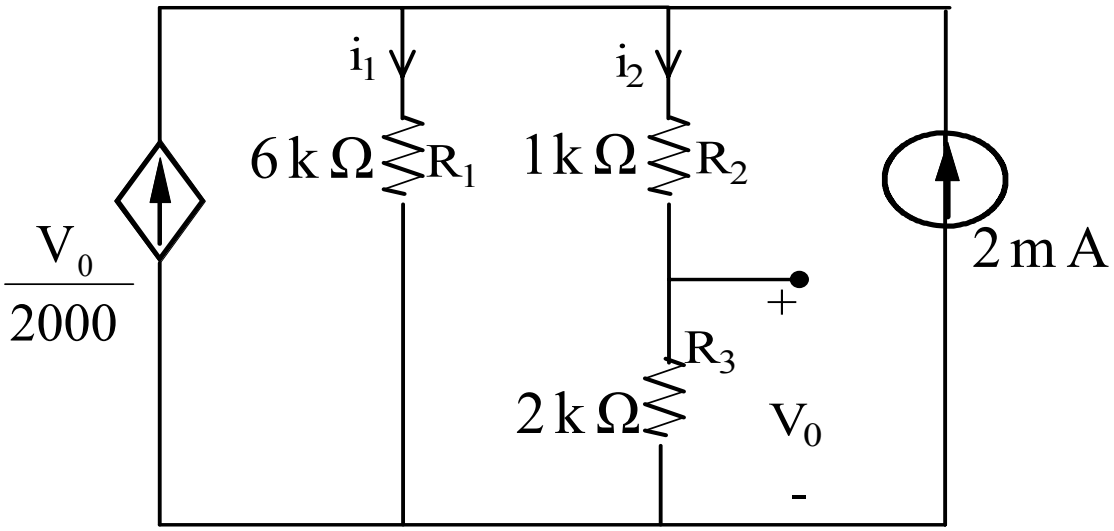
$$-\text{V}_0+(3\text{k})\left(\frac{\text{V}_0}{1\text{k}}\right)=12$$

$$-\text{V}_0+3\,\text{V}_0=12$$

$$\text{V}_0=6\,\text{V}$$

Example:

Find V_0 in the network



$$\frac{V_0}{2000} - i_1 - i_2 + 2\,\text{m A} = 0$$

$$R_1 i_1 = (R_2 + R_3) i_2$$

Also $\quad (6\ \text{k}\,\Omega)\, i_1 = (3\ \text{k}\,\Omega)\, i_2$

$$\therefore \quad i_1 = \frac{1}{2} i_2$$

$$\therefore \quad \frac{V_0}{2000} - \frac{1}{2} i_2 - i_2 + 2\,\mathrm{mA} = 0$$

$$\frac{V_0}{2000} - \frac{3}{2} i_2 + 2\,\mathrm{mA} = 0$$

$$\because \quad V_0 = R_3\, i_2 \quad \Rightarrow \quad i_2 = \frac{V_0}{2\,\mathrm{k}}$$

$$\therefore \quad \frac{V_0}{2\,\mathrm{k}} - \frac{3}{2}\left(\frac{V_0}{2\,\mathrm{k}}\right) + 2\,\mathrm{mA} = 0$$

$$\frac{1}{2}\left(\frac{V_0}{2\,\mathrm{k}}\right) = 2\,\mathrm{mA} \qquad \Rightarrow \quad V_0 = 8\,\mathrm{V}$$