Electrical Circuit (1)

Source Transformation (week9 class1)

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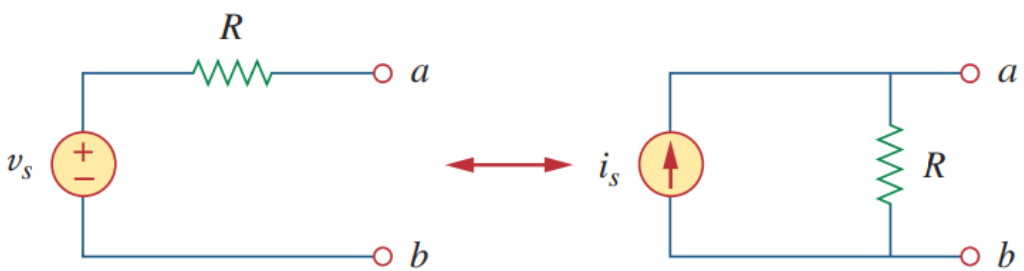
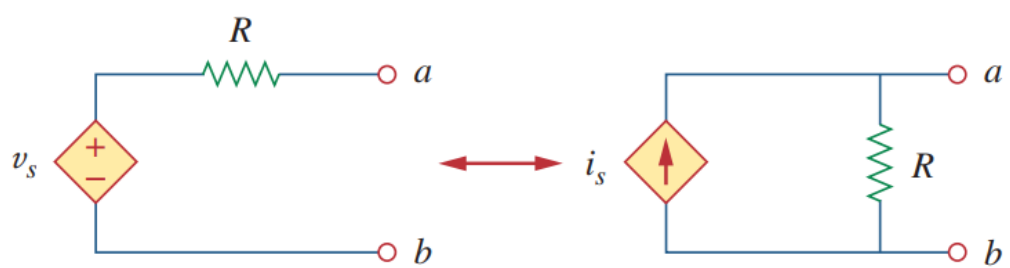
Chapter 4 Circuit Theorems 127

Source Transformation

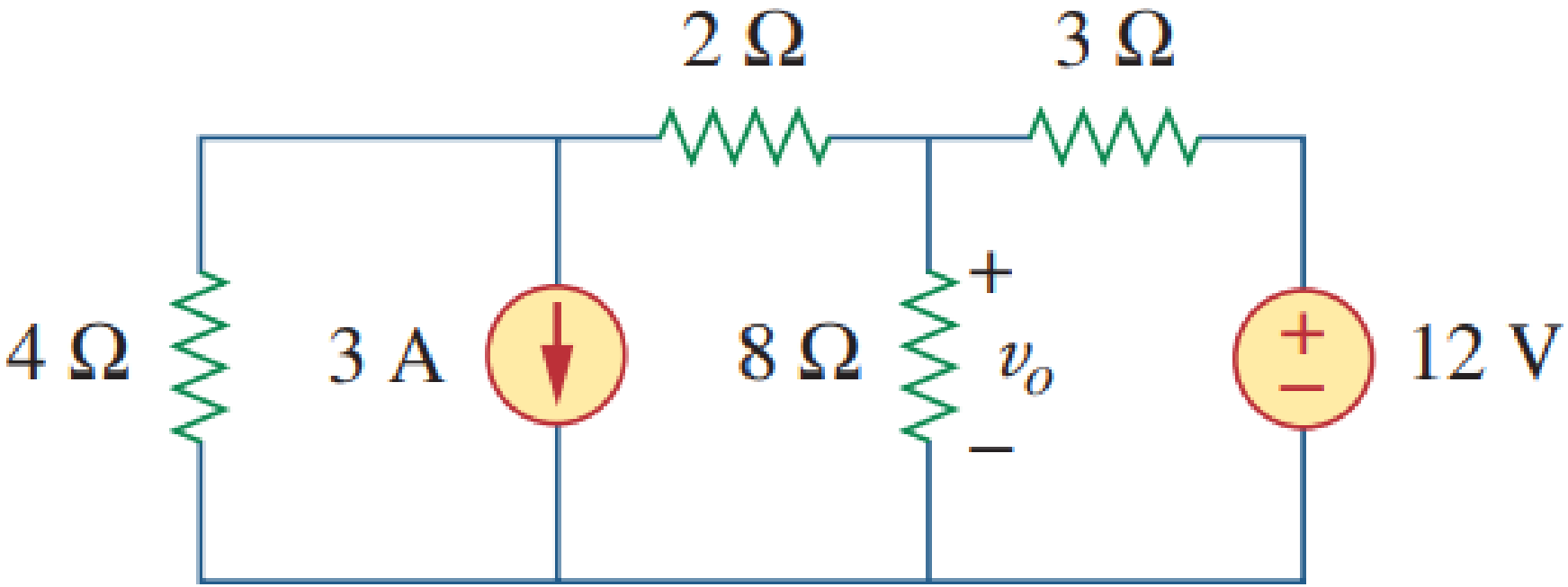
A **source transformation** is the process of replacing a voltage source v_s in series with a resistor R by a current source i_s in parallel with a resistor R, or vice versa.





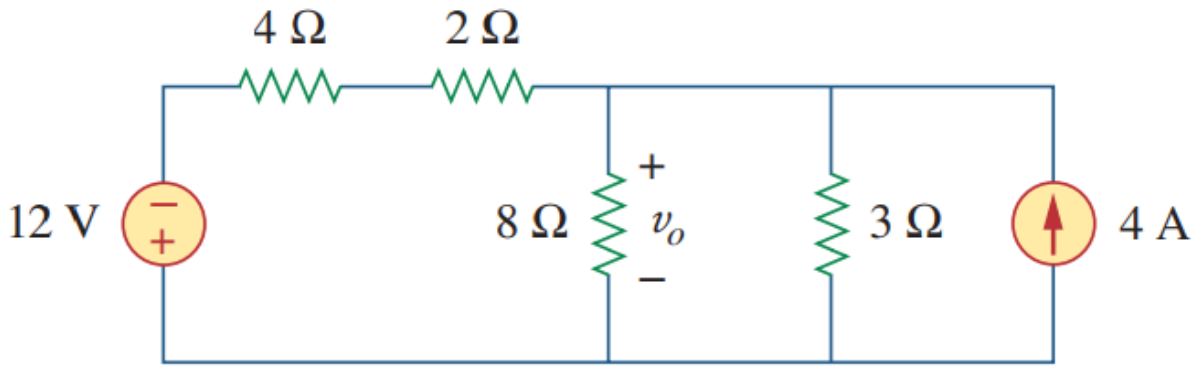
Source Transformation

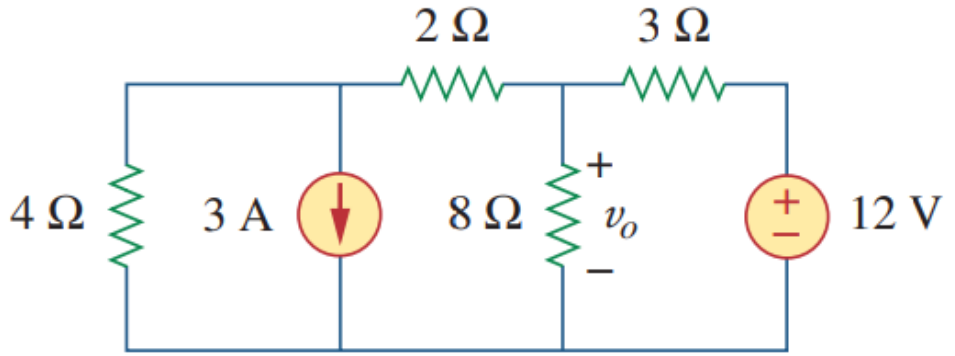
Ex1)

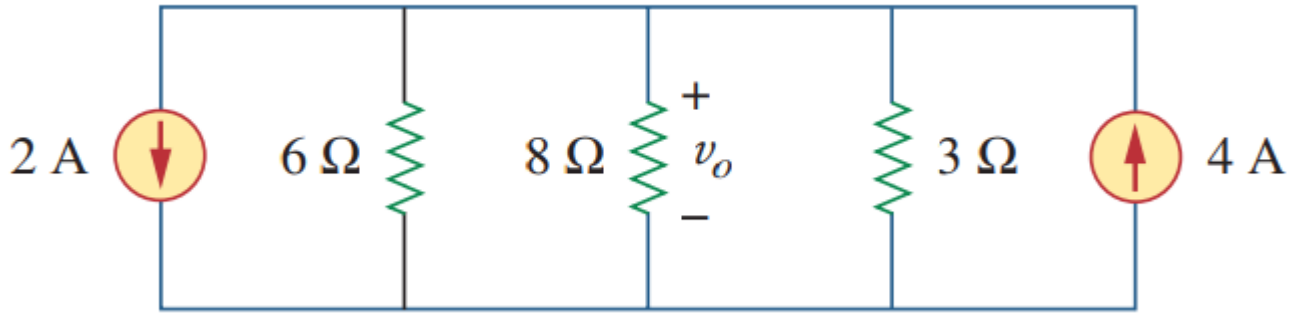


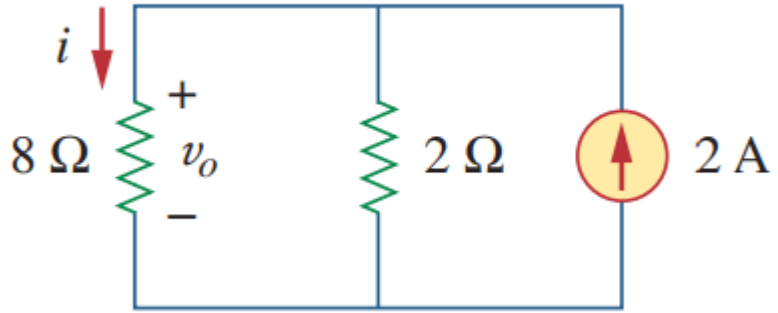
Source Transformation

Ex1)

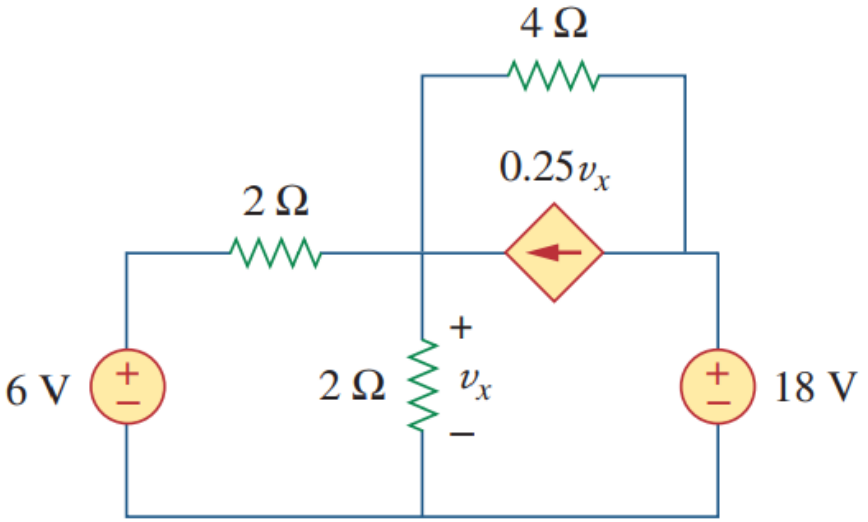


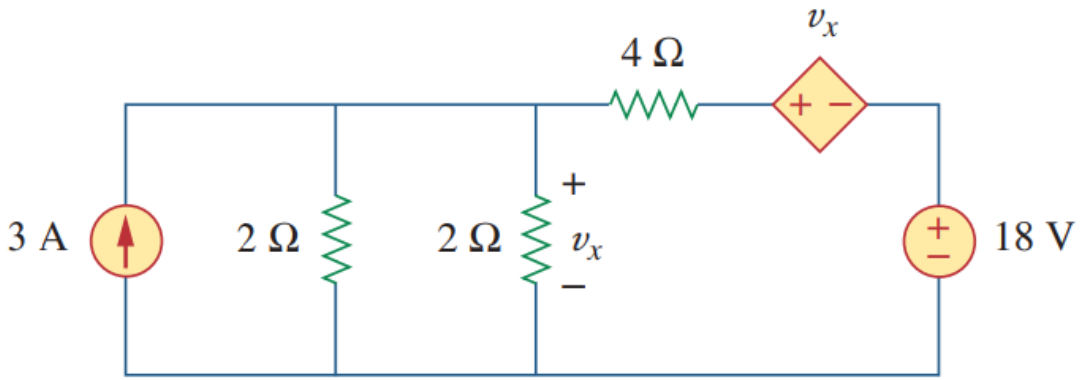


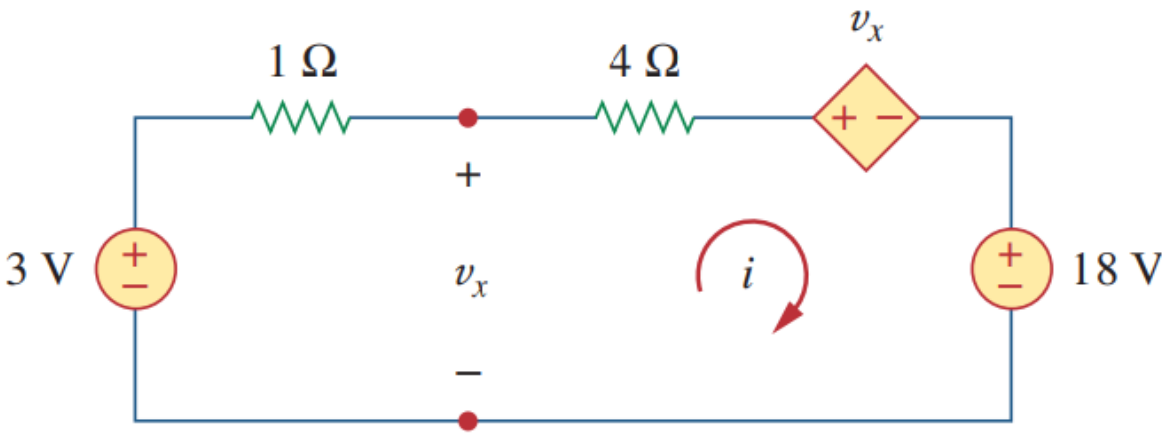




Ex2)

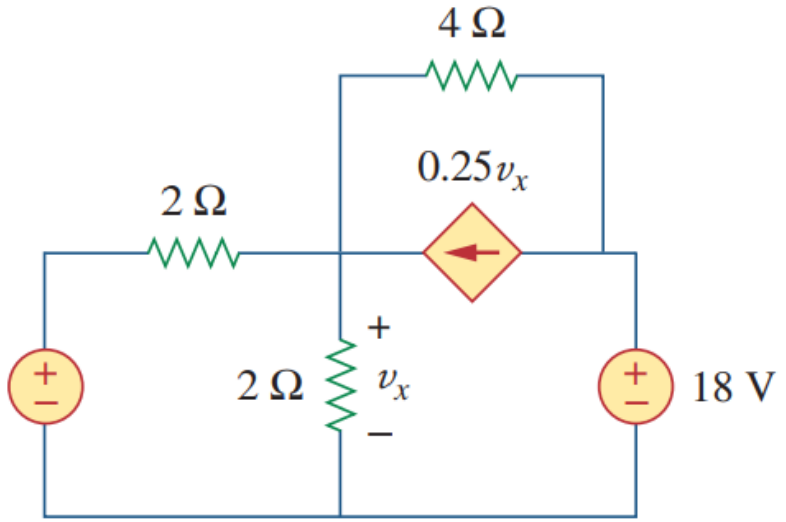


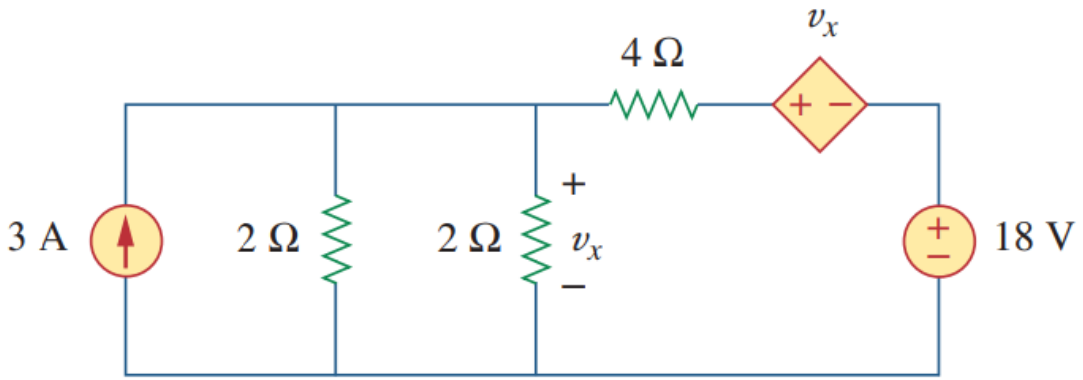


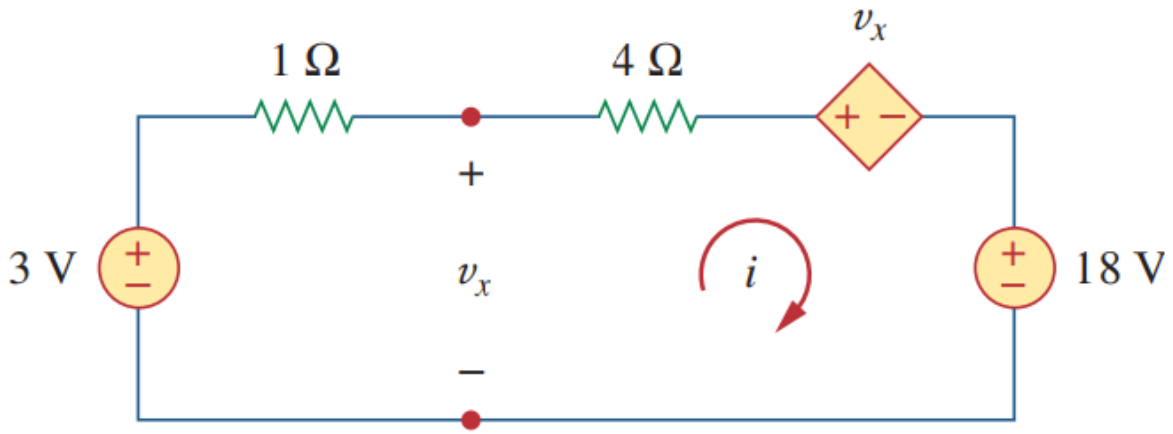


Source Transformation

Ex2)





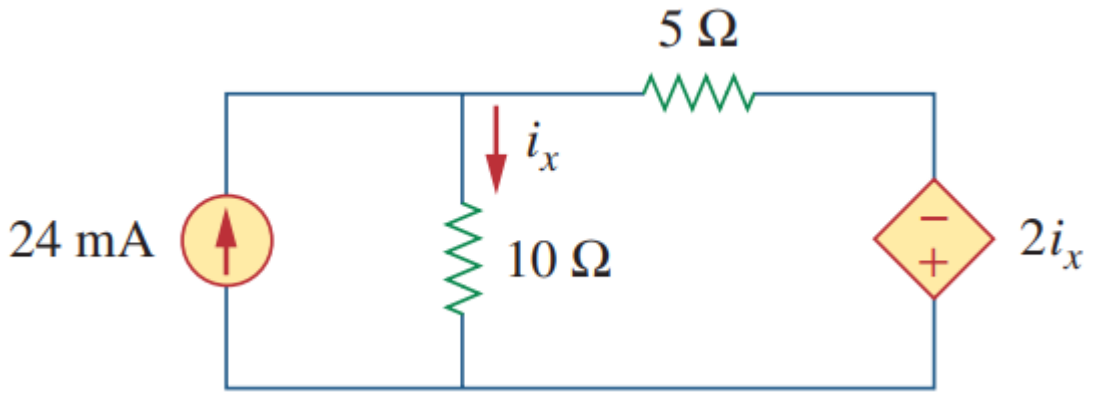


$$-3 + i + 4i + (v_x) + 18 = 0$$

$$-3 + i + 4i + (3 - i) + 18 = 0$$

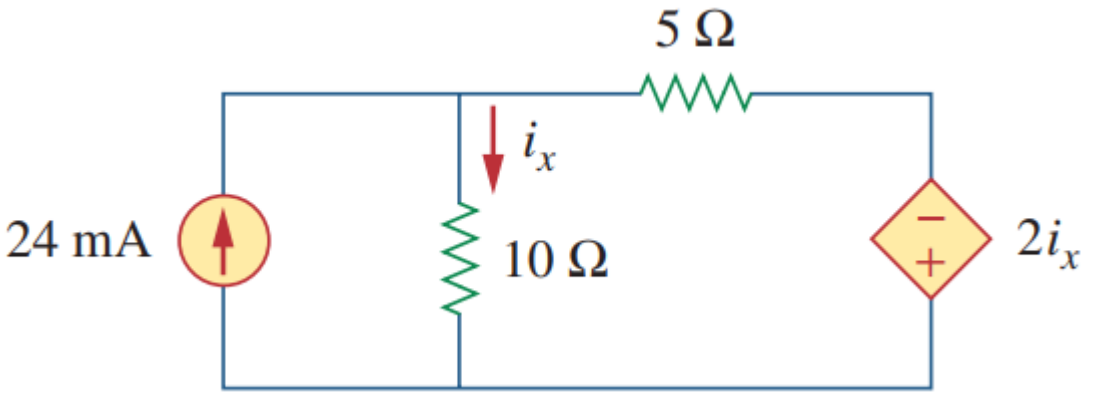
$$4i = -18 \qquad i = -4.5A$$

Ex3)



Answer: 7.059 mA.

Source Transformation



Answer: 7.059 mA.

$$-24mA + \frac{v}{10} + \frac{v}{5} + 2\frac{v}{10 * 5} = 0$$

$$v = -70.5mV$$

$$i_x = \frac{70.5m}{10} = 7.05\ mA$$