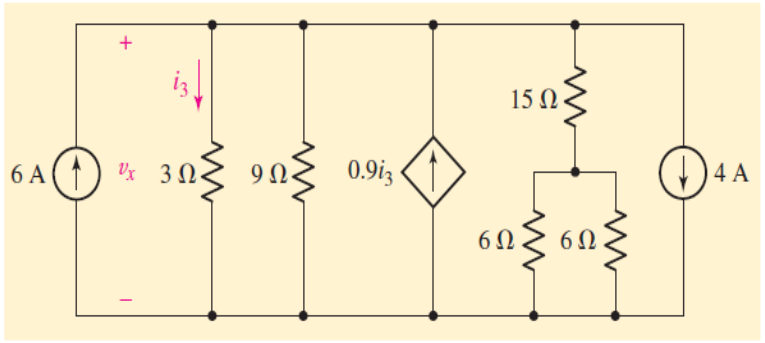
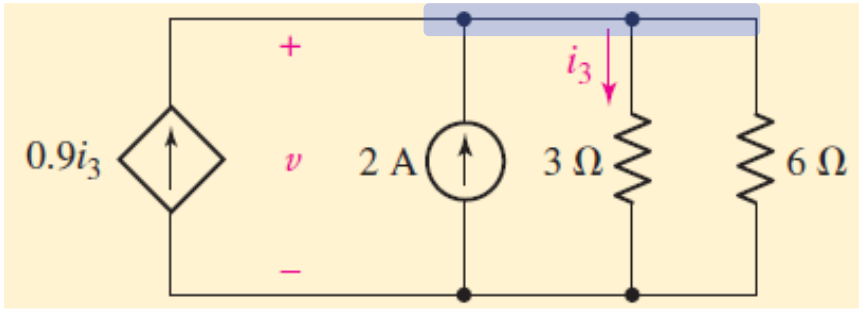
BLM1612 - Circuit Theory

Examples

Example 06

- Calculate the power and voltage of the dependent source in the following Figure.





$$-0.9i_3 - 2 + i_3 + \frac{v}{6} = 0$$

$$v = 3i_3$$

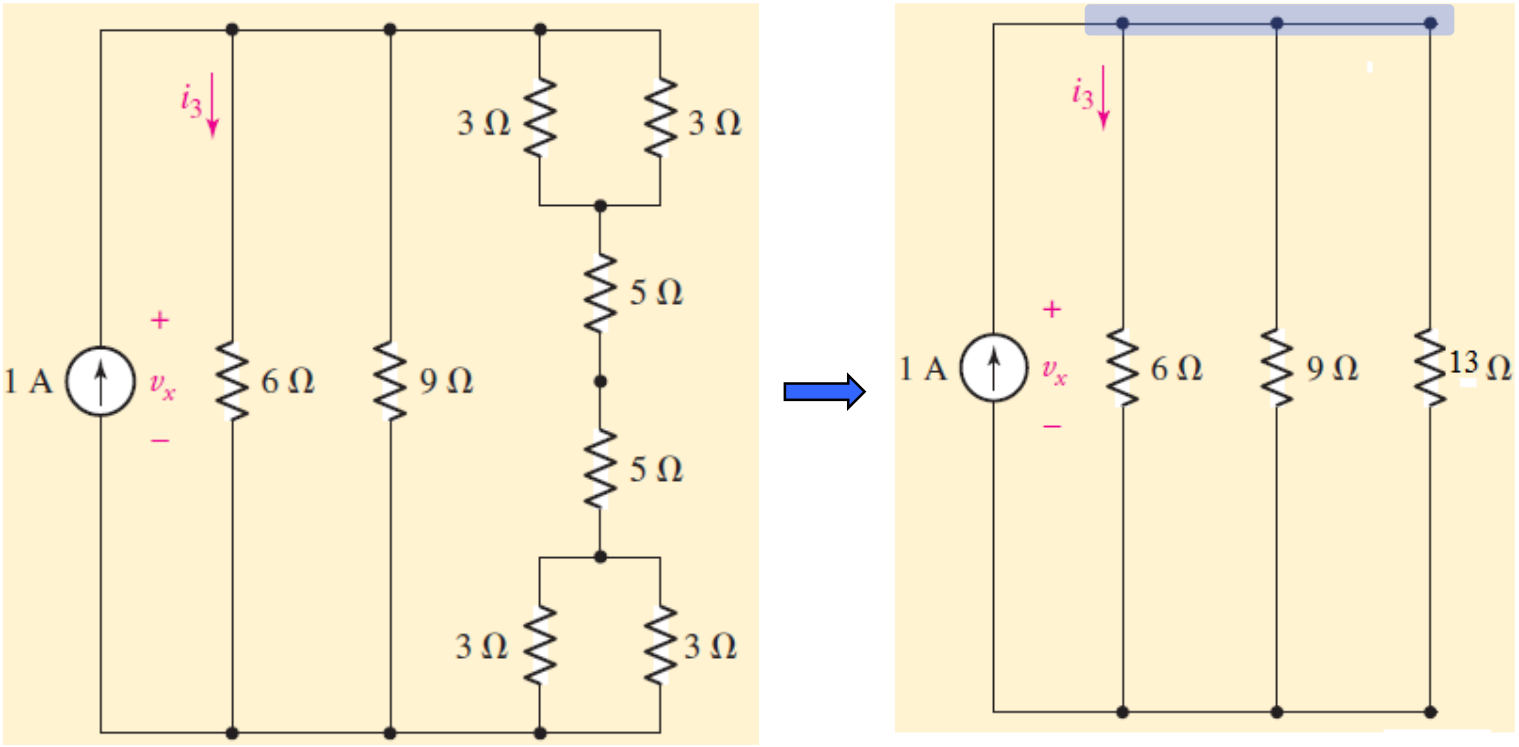
$$i_3 = \frac{10}{3}\ \text{A}$$

$$-v \times 0.9i_3 = -10(0.9)(10/3) = -30\ \text{W}$$

– Actually 30 W is supplied

Example 07

- For the circuit below, calculate the voltage v_x.

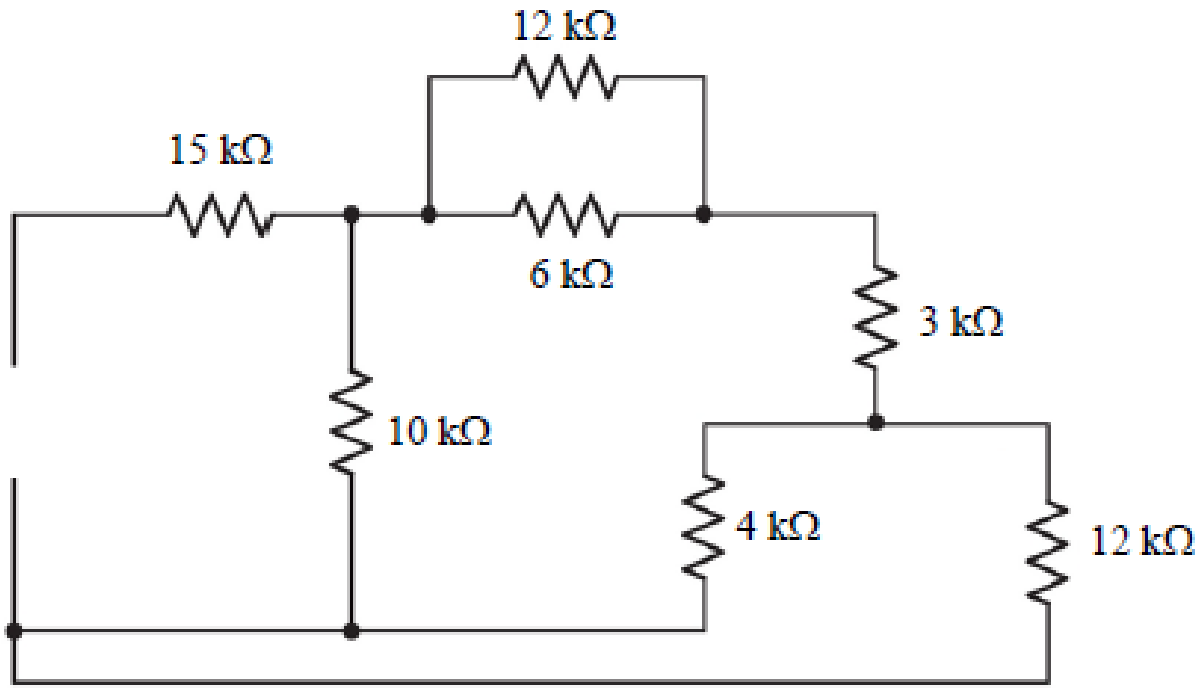


KCL yields $1 = v_x/6 + v_x/9 + v_x/13$

Solving, $v_x = 2.819$ V

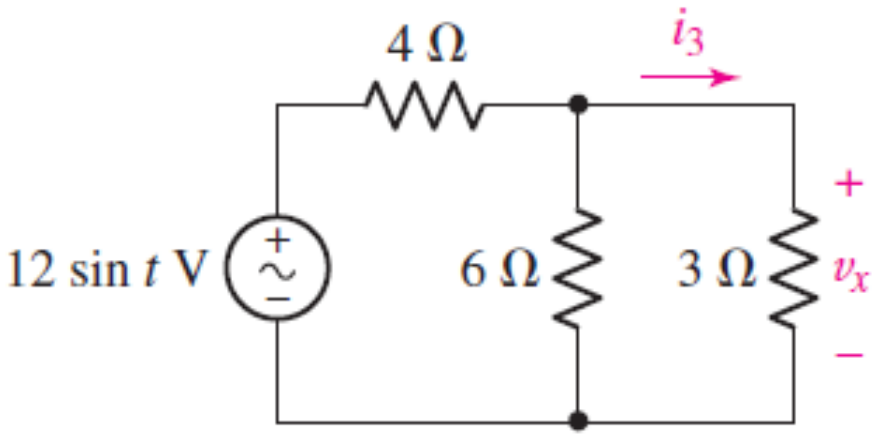
Example 08

- Determine the equivalent resistance of this network between the open-circuit terminals.



- 20 kΩ

Example 09



- Determine i_3 for this circuit.

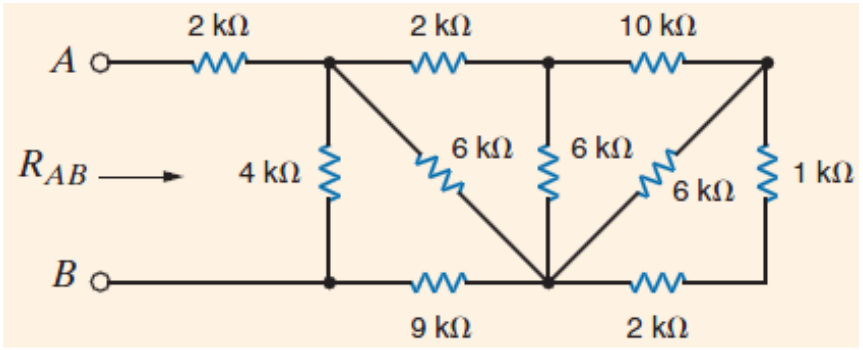
The total current flowing into the 3 Ω–6 Ω combination is

$$i(t) = \frac{12 \sin t}{4 + 3\|6} = \frac{12 \sin t}{4 + 2} = 2 \sin t \quad \text{A}$$

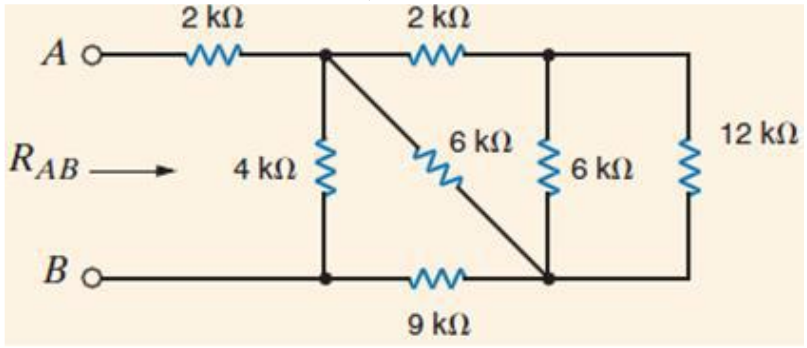
and thus the desired current is given by current division:

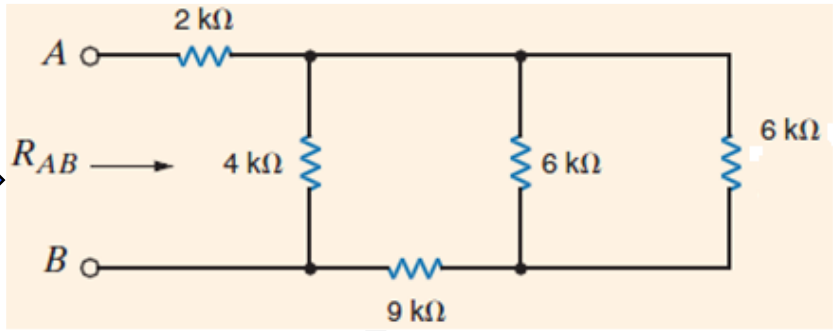
$$i_3(t) = (2 \sin t)\left(\frac{6}{6+3}\right) = \frac{4}{3} \sin t \quad \text{A}$$

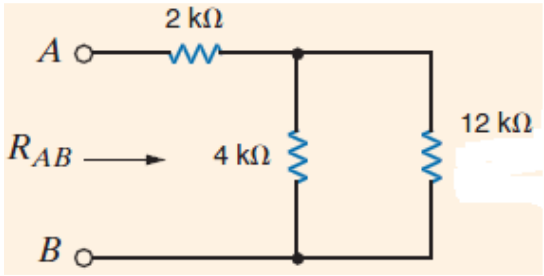
Example 10

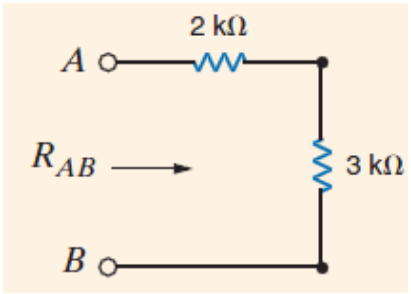


- R_{AB} = ?
- R_{AB} = 5 kΩ

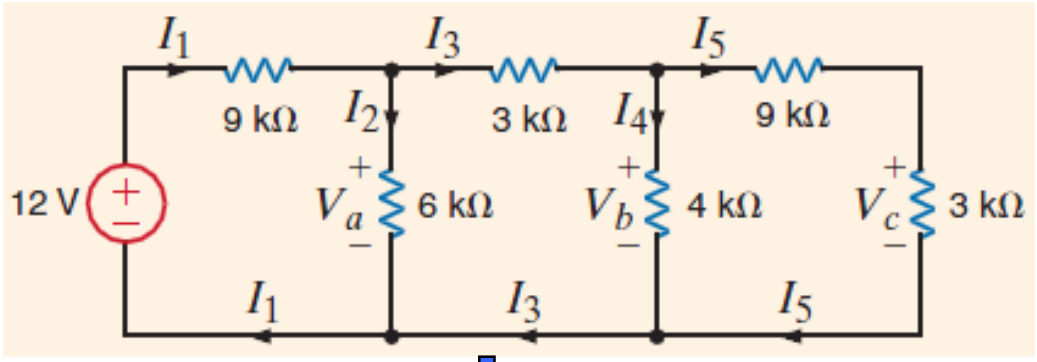


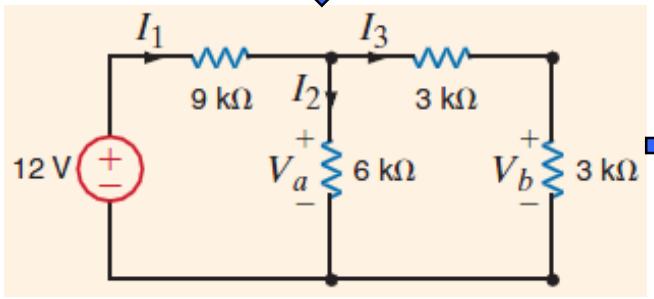


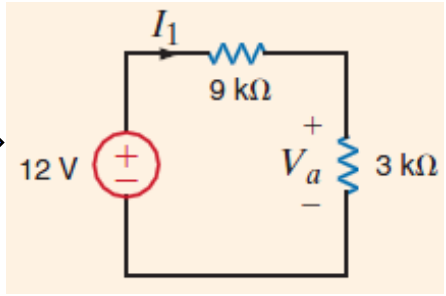


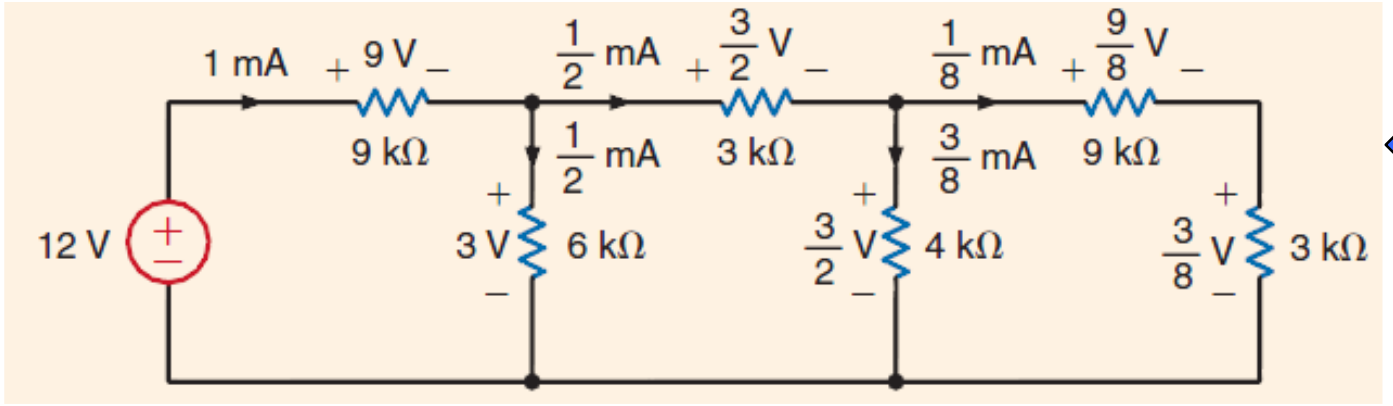


Example 11









- Find all the currents and voltages labeled in the ladder network.