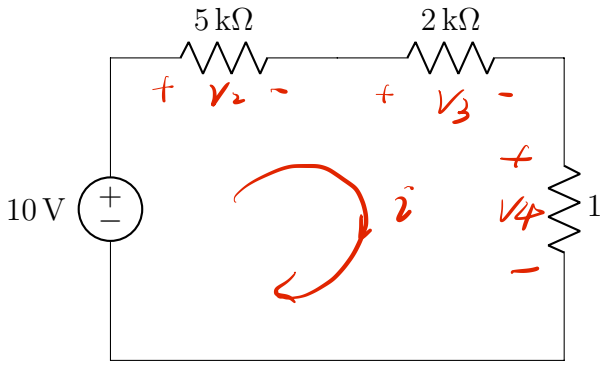
KVL → series
KCL → parallel.

Exercises 02
-
Voltage and current laws

Exercise 1 - Single current 1



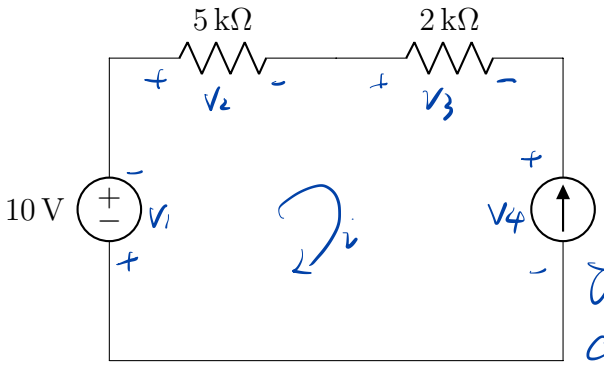
$-V_1 + V_2 + V_3 + V_4 = 0$

$V_1 = 10\,V$

$\frac{V_2}{5k\Omega} = \frac{V_3}{2k\Omega} = \frac{V_4}{10k\Omega}$

Annotate the circuit with the necessary variables.
Determine the voltages for each element.

Exercise 2 - Single current 2



force the current to be 5mA

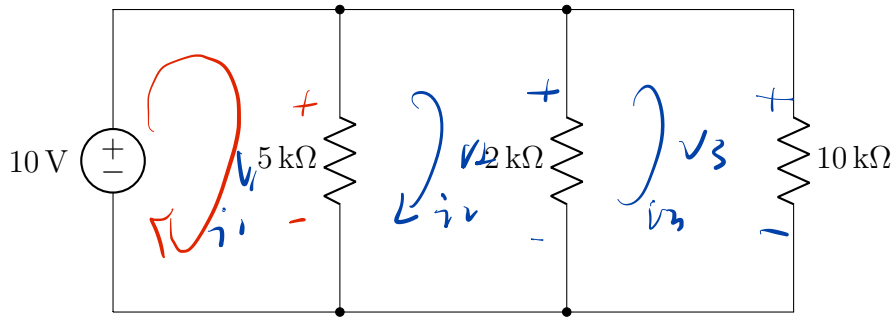
Annotate the circuit with the necessary variables.
Determine the voltages for each element.

$V_1 = -10\,V$

KVL $\quad -10 + V_2 + V_3 + V_4 = 0$

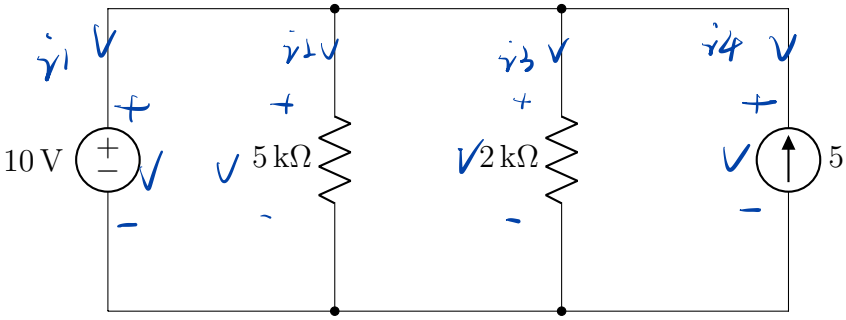
$V_2 = 5k\,i \qquad V_3 = 2k\,i$

Exercise 3 - Single voltage 1



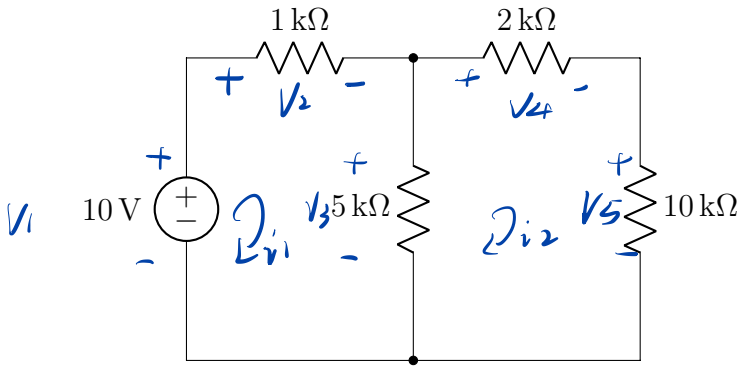
Annotate the circuit with the necessary variables.
Determine the currents for each branch.

Exercise 4 - Single voltage 2



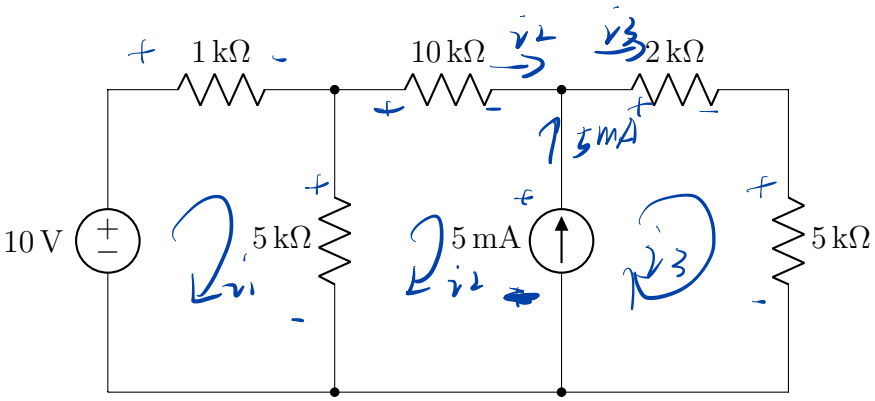
Annotate the circuit with the necessary variables.
Determine the currents for each branch.

Exercise 5 - More complex circuit



Annotate the circuit with the necessary variables.
Determine the volatges and currents for each element.

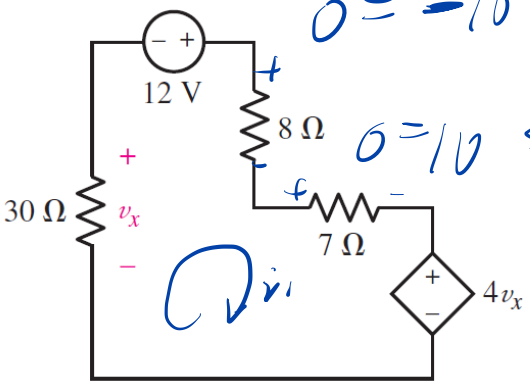
Exercise 6 - Very complex circuit



Annotate the circuit with the necessary variables.
Determine the voltages and currents for each element.

$i_2 + 5mA = i_3$

Exercise 7 - Very complex circuit



$0 = -10 + 1k i_1 + 5k(i_1 - i_2)$

$0 = 10\,k i_2 + V_x - 5k(i_2 - i_1)$

$7k \times (i_2 + 5mA) - V_x = 0$

Determine the power absorbed by each of the five elements in the circuit.

$-30 i_1 - 12 + 8 i_1 + 7 i_1 + 4V_x = 0$

$V_x = -30 i_1$