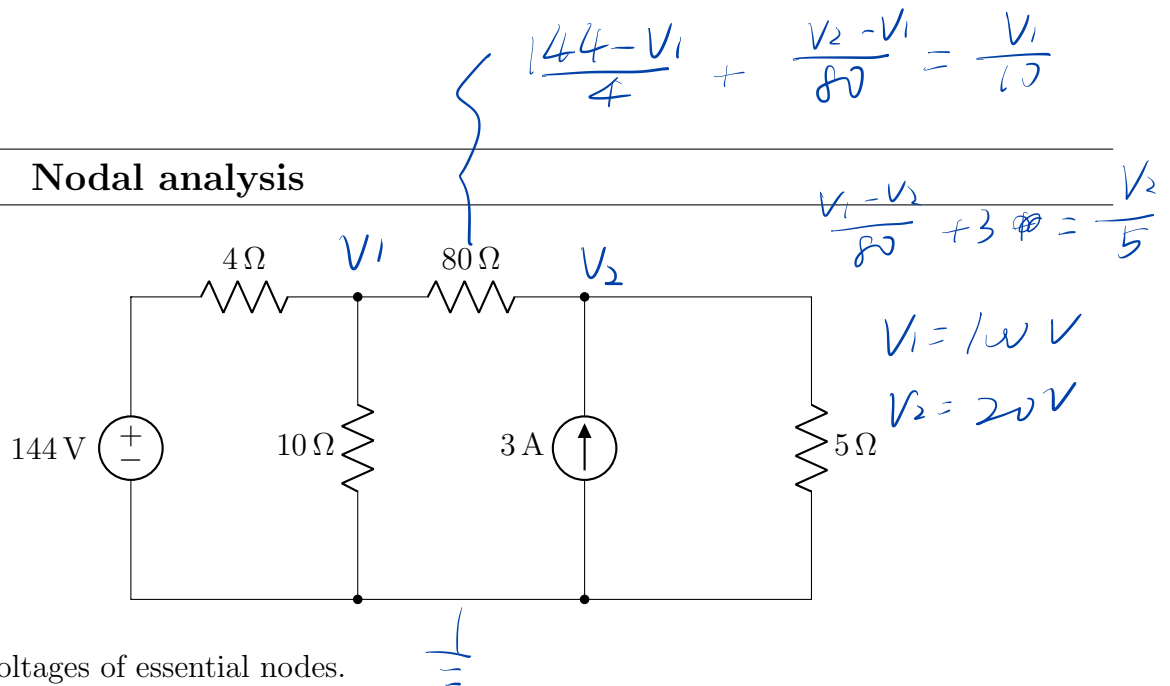


## Exercises 04

### Nodal and Mesh Analysis

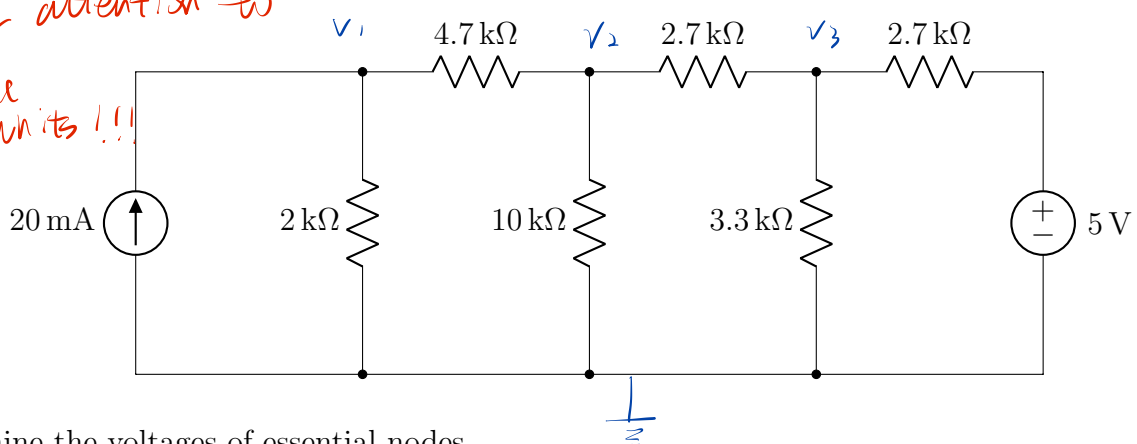
#### Exercise 1 - Nodal analysis



Determine the voltages of essential nodes.

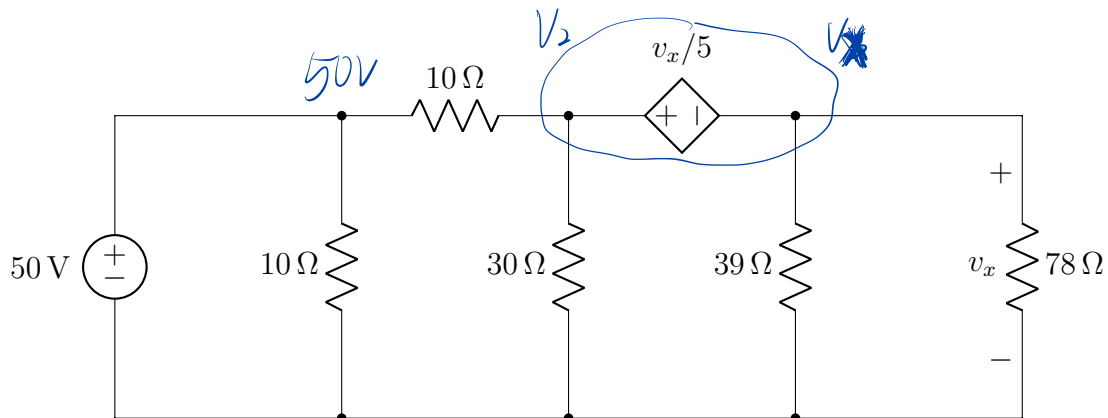
#### Exercise 2 - Nodal analysis 2

*Pay attention to the units!!!*



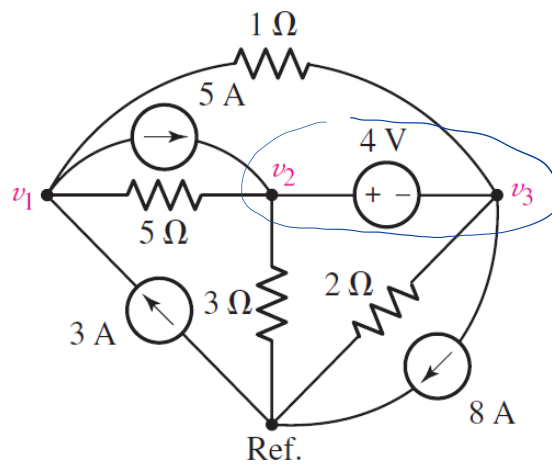
Determine the voltages of essential nodes.

### Exercise 3 - Supernode



Determine the voltages of essential nodes.

### Exercise 4 - Supernode



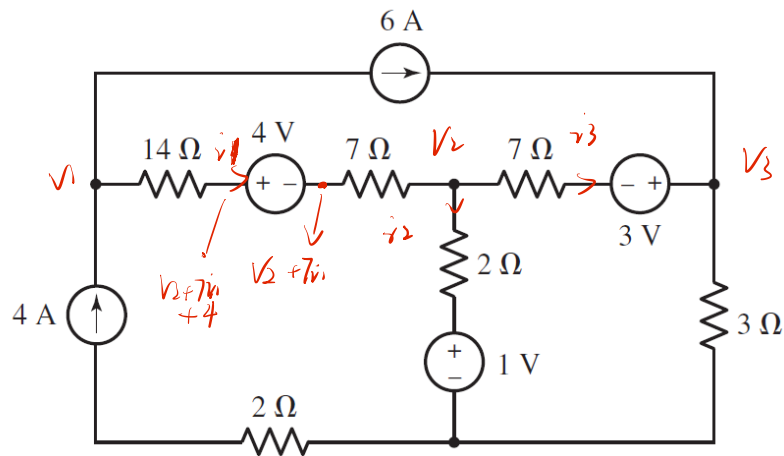
Determine the nodal voltages.

$$\left\{ \begin{aligned} 3A &= \frac{v_1 - v_2}{5\Omega} + 5A + \frac{v_1 - v_3}{1\Omega} \\ \frac{v_1 - v_2}{5\Omega} + 5A + \frac{v_1 - v_3}{1\Omega} &= \frac{v_2}{3\Omega} + \frac{v_3}{2\Omega} + 8A \end{aligned} \right.$$

$$v_2 - v_3 = 4V$$

$$v_1 = -\frac{73}{11}V \quad v_2 = -\frac{18}{11}V \quad v_3 = -\frac{62}{11}V$$

## Exercise 5 - Supernode



Determine the numerical value for the power supplied by the 1 V source.

$$V_1 - V_2 = i_1 (14\Omega + 7\Omega) + 4V$$

Voltage drop.

## Exercise 6 - Mesh Analysis

Analyze the circuits from previous exercises with mesh analysis. Determine the virtual mesh currents.