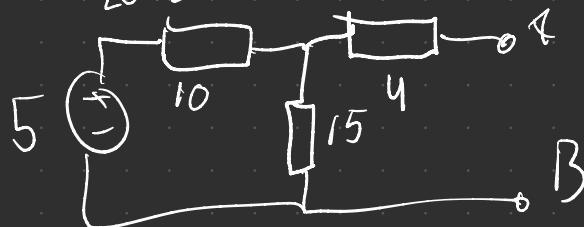
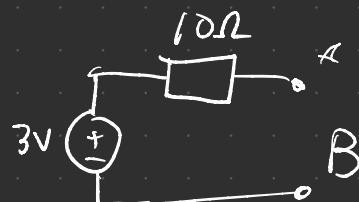


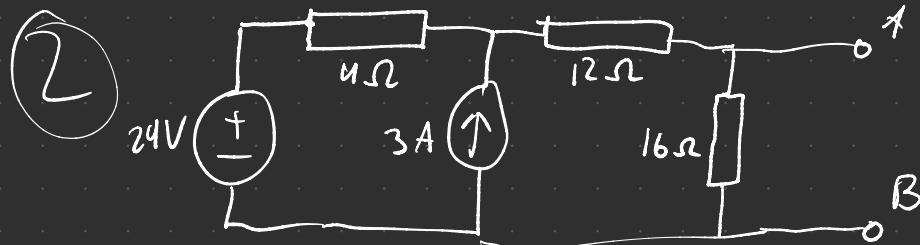
$$R_2 = \frac{20 \cdot 20}{20+20} = 10 \Omega \quad R_3 = \frac{10 \cdot 10}{10+10} = 5 \Omega$$



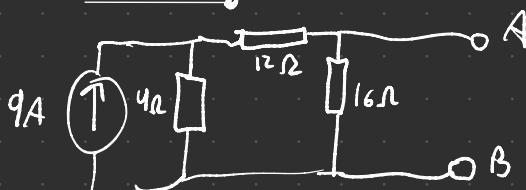
$$R_{the} = 4 + \frac{10 \cdot 15}{10+15} = \underline{\underline{10 \Omega}}$$

$$V_{the} = 5V \cdot \frac{15}{25} = \underline{\underline{3V}}$$





$$24V \xrightarrow{4\Omega} I = \frac{24V}{4\Omega} = 6A$$



$$9A \cdot 4\Omega = 36V$$

$$V_{th} = 36V \cdot \frac{16\Omega}{16\Omega + 16\Omega} = 18V$$

$$R_{th} = \frac{16\Omega \cdot 16\Omega}{16\Omega + 16\Omega} = 8\Omega$$



$$I = \frac{50V}{100\Omega} = 0.5A$$



$$I = \frac{5V}{200\Omega} = 25mA$$

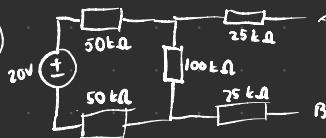
$$R = \frac{200 \cdot 50\Omega^2}{250\Omega} = 40\Omega$$

$$V = 25mA \cdot 40 = 1V$$

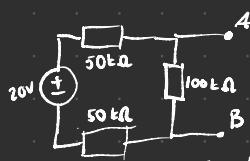
$$I = \frac{1V}{300\Omega} = 3.3mA$$

$$R_{th} = 300\Omega$$

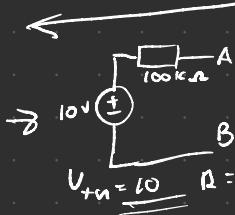
(4)

Setter
V=0

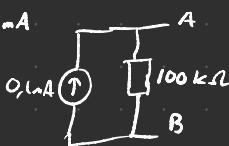
$$R = \frac{25\text{k}\Omega + 25\text{k}\Omega}{50\text{k}\Omega + \frac{(100\text{k}\Omega)}{200\text{k}\Omega}} = \frac{(50\text{k}\Omega + 50\text{k}\Omega) || (100\text{k}\Omega)}{100\text{k}\Omega}$$



$$V_{+n} = 20\text{V} \cdot \frac{100\text{k}\Omega}{200\text{k}\Omega} = 10\text{V}$$

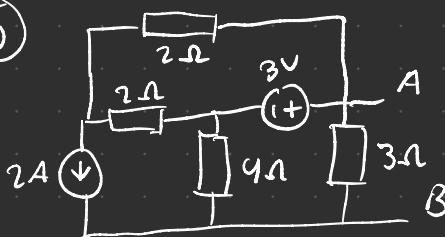


$$I = \frac{10\text{V}}{100\text{k}\Omega} = 0,1\text{mA}$$



$$0,1\text{mA} \uparrow \quad I = 0,1\text{mA}$$

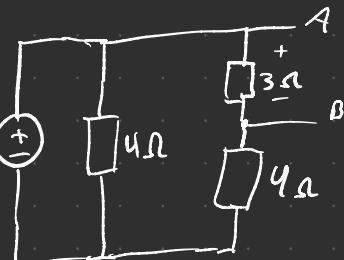
(5)



Superposition:

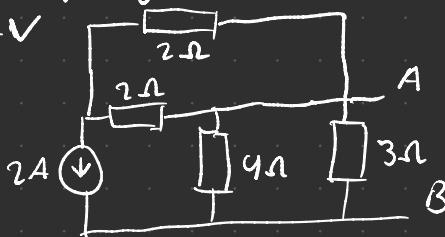
tar strømkilden

$$AV = 3\text{V} \cdot \frac{3\Omega}{4\Omega + 3\Omega} = \frac{9}{7}\text{V}$$



tar spenningskilden

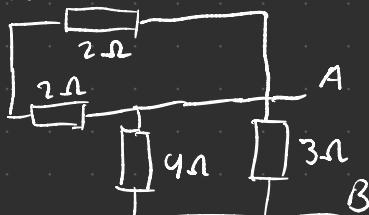
AV



$$I_{R_{4\Omega}} = 2\text{A} \cdot \frac{4\Omega}{3\Omega + 4\Omega} = \frac{8}{7}\text{A}$$

$$V_{R_{4\Omega}} = -\frac{8}{7} \cdot 3 = -\frac{24}{7}\text{V}$$

$$V_{+n} = \left(\frac{9}{7} - \frac{24}{7}\right)\text{V} = -\frac{15}{7}\text{V}$$

Finner $R \rightarrow$ tar strøm og spennin av

$$R = (4/3)\Omega = \frac{(4 \cdot 3)\Omega}{7\Omega} = \frac{12}{7}\Omega$$

6)
$$I = \frac{5V}{2000\Omega} = 2.5mA$$

$$R_{th} = \frac{2000\Omega^2}{3000\Omega} = 667\Omega$$

$$V_{th} = 1.67V \cdot \frac{1000\Omega}{1667\Omega + 3 \cdot 1000\Omega} = 0.45V$$

$$R_{out} = \frac{2667\Omega \cdot 1000\Omega}{3667\Omega} = 727\Omega$$

$$V = 2,5 \cdot 10^{-3} \cdot 667\Omega = 1,67V$$

7) a)
$$R_{th} = 7.5\Omega + \frac{23.5 \cdot 10}{37.5} + 15\Omega < 29.15\Omega$$

$$V_{th} = V \cdot \frac{10}{2.5\Omega + 15\Omega + 10\Omega} = 0.308V$$

b)
$$I = \frac{0.308V}{29.4\Omega + 14\Omega} = 0.007V$$

$$P = I^2 \cdot R$$

$$I^2 = \frac{P}{R}$$

$$I = \sqrt{\frac{P}{R}}$$

$$V = \frac{\sqrt{100\Omega}}{14\Omega} = 12V$$

8)
$$R_{th} = 2\Omega + 8\Omega + \frac{40 \cdot 24}{40+10} \Omega = 25\Omega$$

a)
$$V_{th} = 600V \cdot \frac{40\Omega}{14+10+40} = 375V$$

$$V_{th} = 375V - 105V - 24V = 146V$$

b)
$$I = \frac{246V}{(25+6)\Omega} = 7.94A$$

c)
$$I = \frac{246V}{(25+6)\Omega} = 7.94A$$

$$I = 12.4 \cdot \frac{14}{14+10+40} = 263mA$$

$$V = 2.63A \cdot 4\Omega = 10.5V$$

$$V_{th} = 17A \cdot 2\Omega = 34V$$

