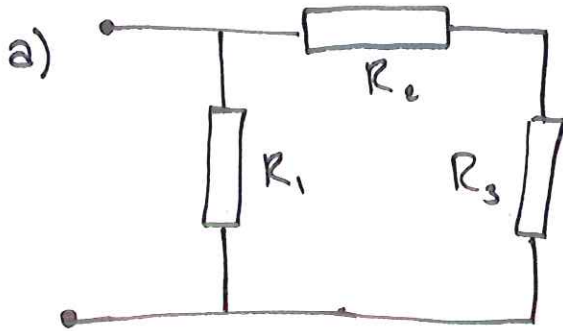


KAPITEL 2

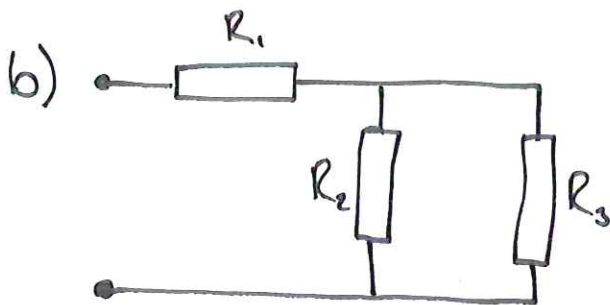
2.2

Bestäm resistorn som kan ersätta resistanserna



$$\frac{1}{R_e} = \frac{1}{R_1} + \frac{1}{R_2 + R_3}$$

$$R_e = \frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3}$$

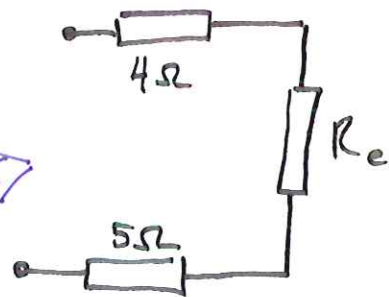
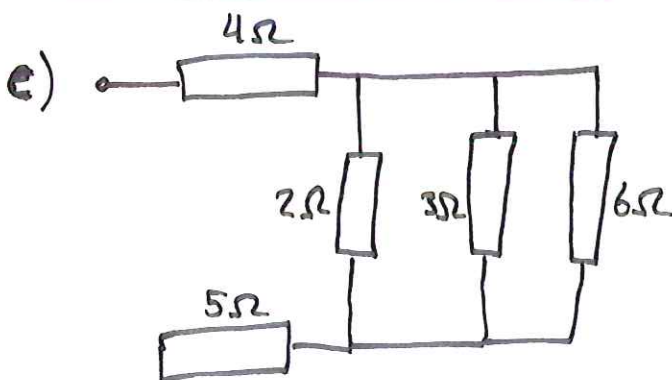


Vi ersätter R_2 & R_3 med:

$$\frac{1}{R_{23}} = \frac{1}{R_2} + \frac{1}{R_3}$$

$$\Rightarrow R_{23} = \frac{R_2 R_3}{R_2 + R_3}$$

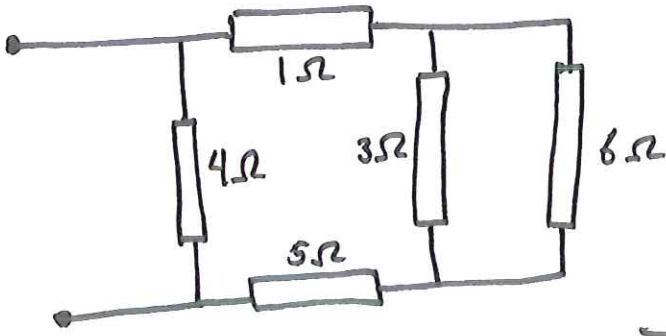
svor. $R_e = R_1 + \frac{R_2 R_3}{R_2 + R_3}$



$$\frac{1}{R_e} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6} \Rightarrow R_e = 1\Omega$$

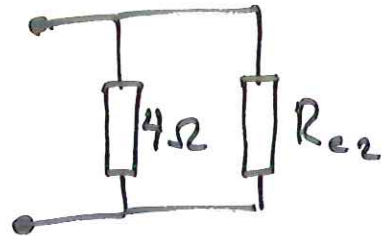
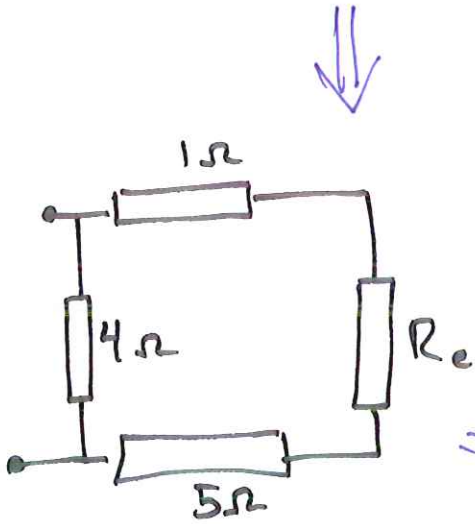
$$R_{tot} = 4 + R_e + 5 = 10\Omega$$

d)



$$\frac{1}{R_e} = \frac{1}{3} + \frac{1}{6} = \frac{1}{2}$$

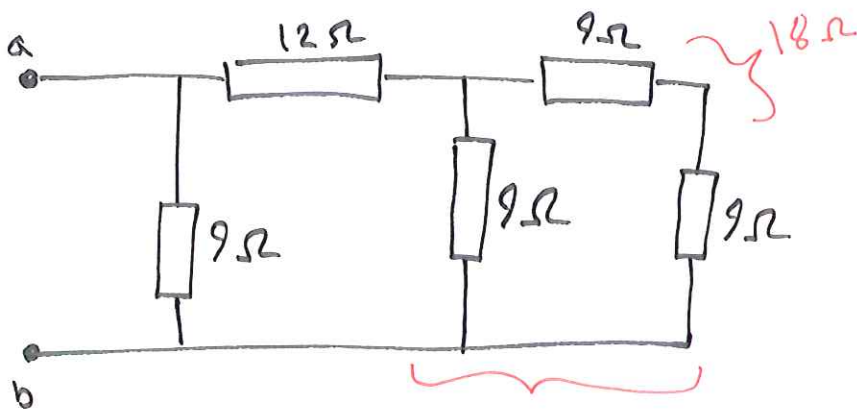
$$\Rightarrow R_e = 2\Omega$$



$$R_{e2} = R_e + 1 + 5 = 8\Omega$$

$$\frac{1}{R_{tot}} = \frac{1}{4} + \frac{1}{R_{e2}} = \frac{1}{4} + \frac{1}{8} \Rightarrow R_{tot} = \frac{8}{3}$$

2.3



$$\frac{18 \cdot 9}{18 + 9} = 6$$

$$12 + 6 = 18$$

$$\frac{18 \cdot 9}{18 + 9} = 6$$

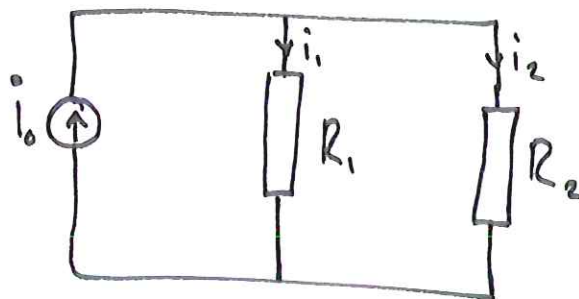
Svar: 6Ω

2.7 Bestäm i_1 och i_2

$$a) R_{tot} = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$V = R_{tot} \cdot i_0$$

~~$R_0 = R_1 + R_2$~~

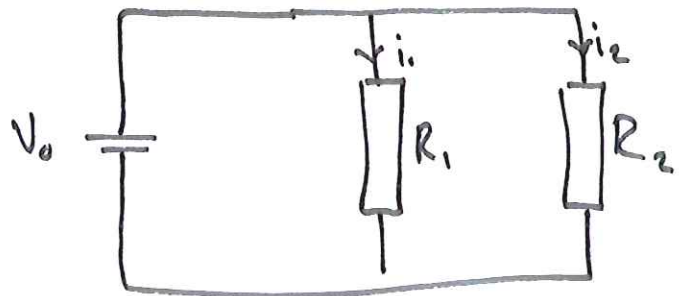


$$i_1 = \frac{V}{R_1} = \frac{\frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}}{R_1} = \frac{R_2}{R_1 + R_2}$$

$$i_2 = \frac{V}{R_2} = \frac{\frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}}{R_2} = \frac{R_1}{R_1 + R_2}$$

b)

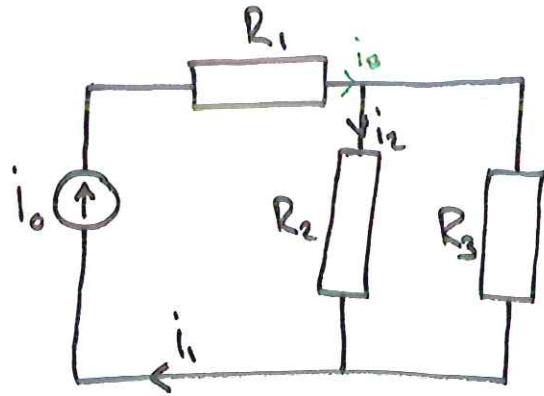
$$i_1 = \frac{V_0}{R_1}, \quad i_2 = \frac{V_0}{R_2}$$



c)

$$i_1 = i_0 \quad (\text{ser vi direkt})$$

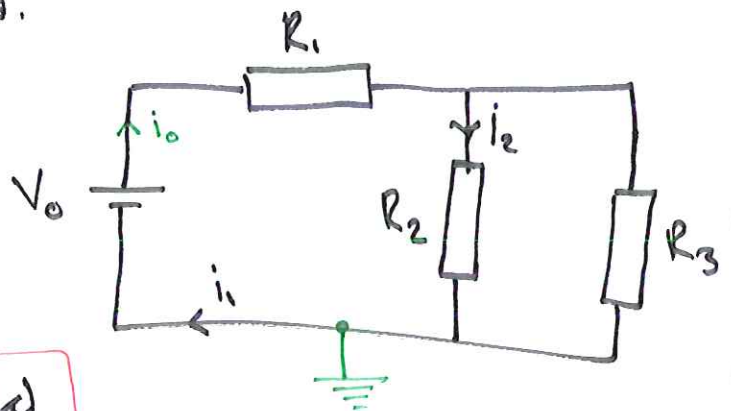
$$i_2 = \frac{R_1}{R_1 + R_2} i_0$$



d) Vi börjar med att jorda.

$$V_0 = R_{\text{tot}} \cdot i_0$$

$$R_{\text{tot}} = R_1 + \frac{R_2 R_3}{R_2 + R_3}$$



$$i_1 = i_0 = \frac{V_0}{R_{\text{tot}}} = \frac{V_0 (R_2 + R_3)}{R_1 (R_2 + R_3) + R_2 R_3}$$

$$i_2 = \frac{R_3}{R_2 + R_3} i_0 = \frac{R_3 (R_2 + R_3) V_0}{(R_1 (R_2 + R_3) + R_2 R_3) (R_2 + R_3)}$$

$$= \frac{R_3}{R_1 R_2 + R_1 R_3 + R_2 R_3}$$

2.8 Bestäm V_1

a) Först beräknar vi i_0 .

$$R_{tot} = 2R + \frac{4R^2}{4R+R} + 3R =$$
$$= 5R + \frac{4}{5}R =$$

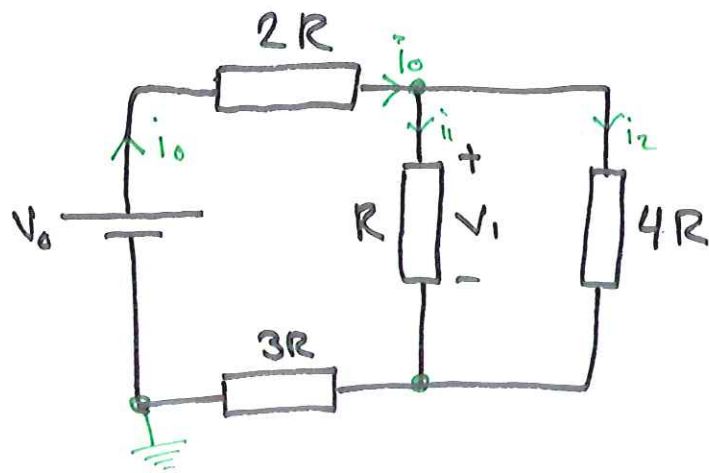
$$i_0 = \frac{V_0}{R_{tot}} = \frac{5V_0}{29R}$$

$$i_1 = \frac{4R}{R+4R} i_0 = \frac{4}{5} \cdot \frac{5V_0}{29R} = \frac{4V_0}{29R}$$

~~$V_1 = \frac{i_1}{R} = \frac{4V_0}{29}$~~

$$V_1 = R \cdot i = \frac{4V_0}{29}$$

SKRIV OM



2.8 Bestäm v_1

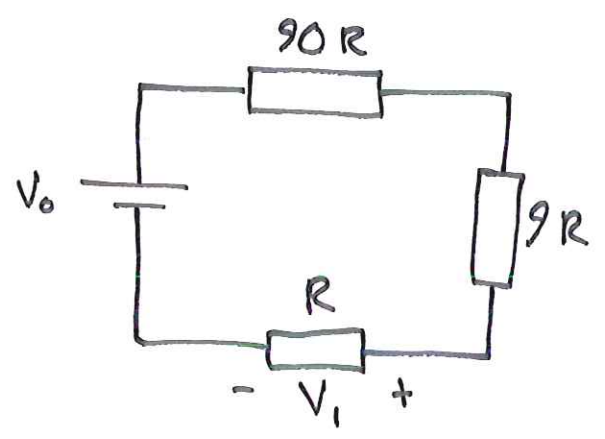
a)

b)

$$R_{tot} = 100R$$

$$i_o = \frac{V_o}{R_{tot}} = \frac{V_o}{100R}$$

$$V_1 = R \cdot i_1 = R \cdot i_o = \frac{V_o}{100}$$

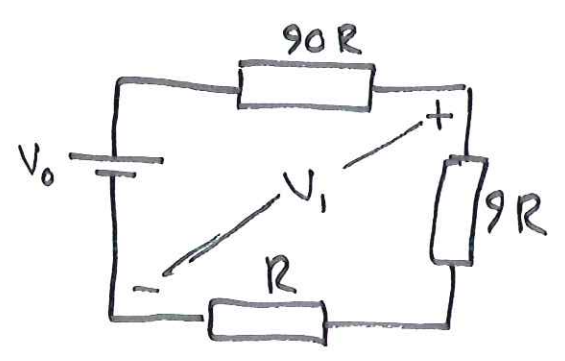


c)

$$R_{tot} = 100R$$

$$i_o = \frac{V_o}{R_{tot}} = \frac{V_o}{100R}$$

$$V_1 = (9R + 1R) i_o = \frac{V_o}{10}$$



2.15

$$R_1 = 70 \Omega \quad i_0 = 200 \text{ mA}$$

$$i_2 = \frac{R_1}{R_1 + R_2} i_0, \quad i_1 = \frac{R_2}{R_1 + R_2} i_0$$

Vi vill att $i_1 = 1 \text{ mA}$

Vad blir i_1, i_2, i_0 ?

$$i_2 = i_0 - i_1 = 200 - 1 = \underline{199 \text{ mA}}$$

$$i_2 = 199 = \frac{70 \cdot 200}{70 + R_2} \Rightarrow R_2 = \frac{700 \cdot 200 - 199 \cdot 70}{199} = \underline{0.35 \Omega}$$

