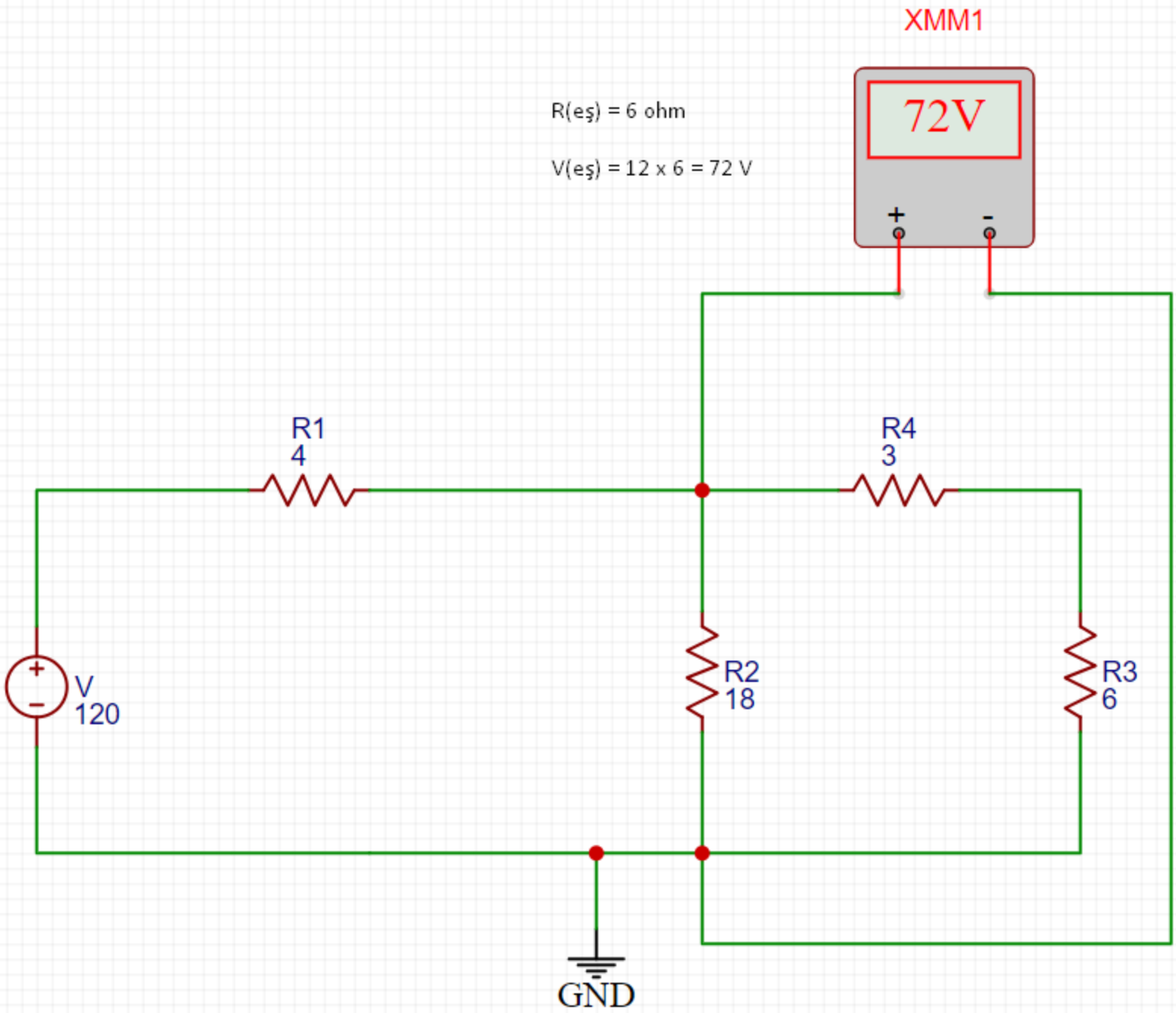
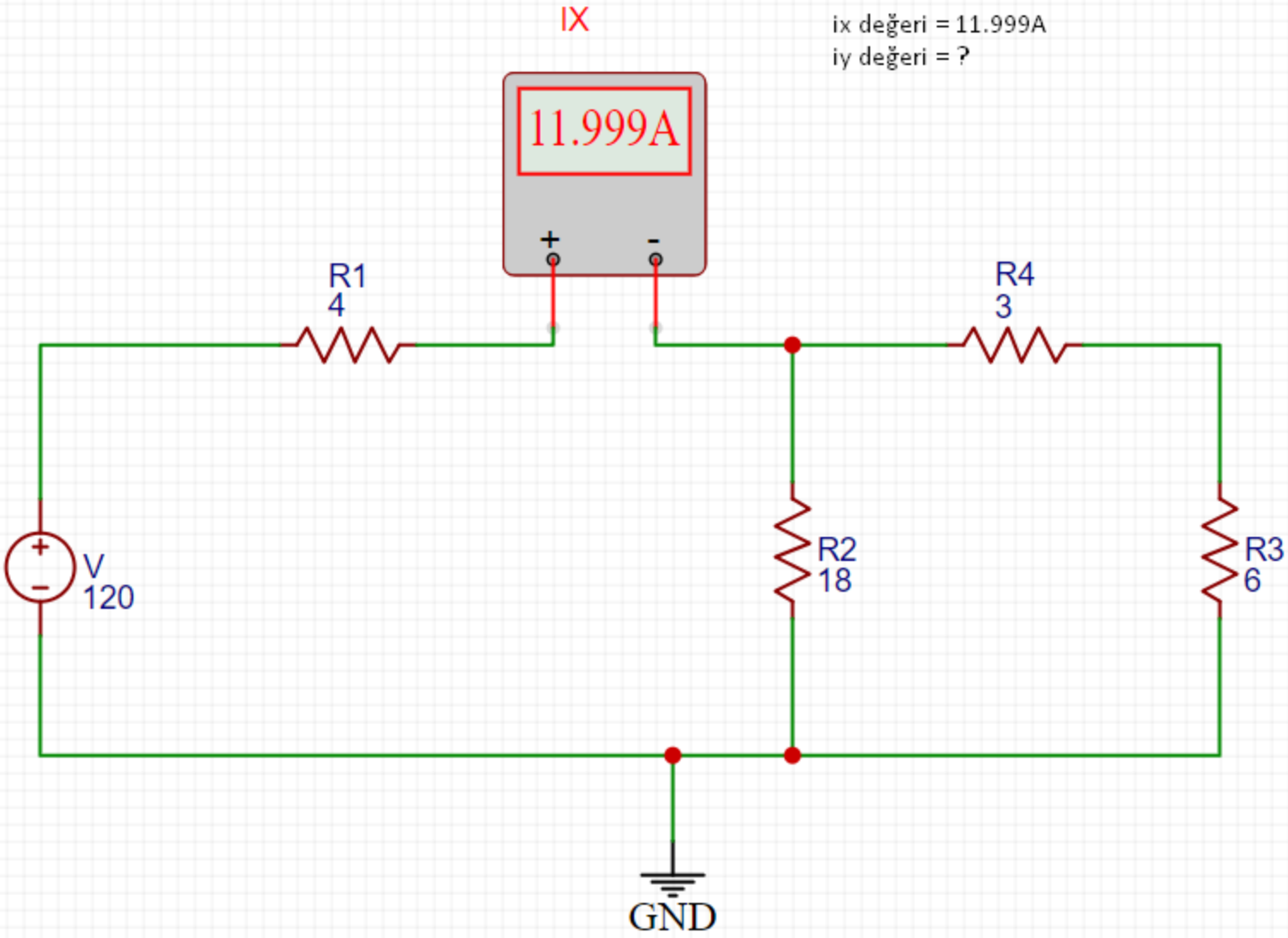
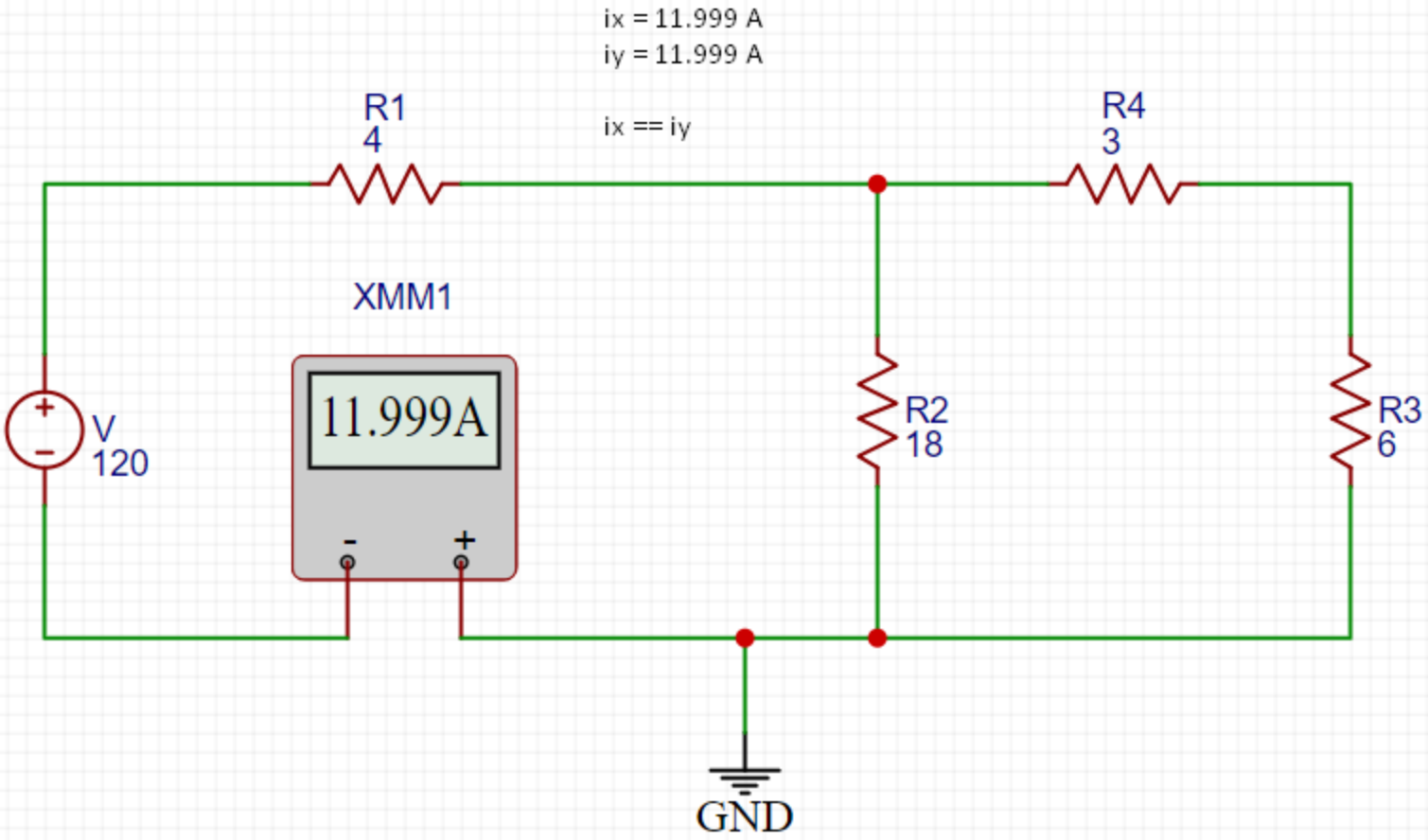
31)



3 1)

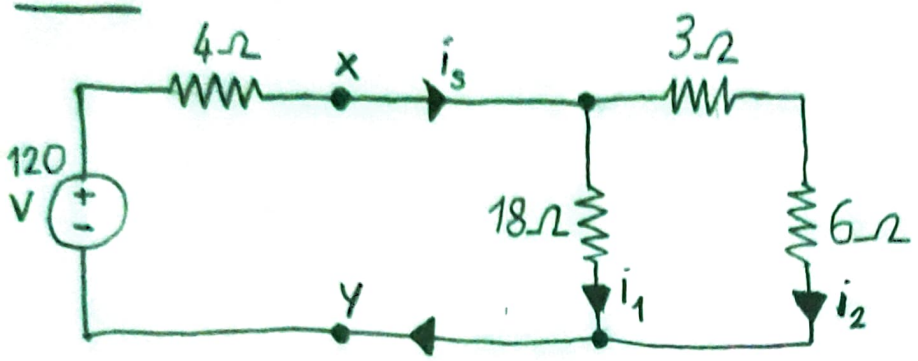

IX
11.999A
+
-
ix değeri = 11.999A
iy değeri = ?
R1
4
R4
3
V
120
R2
18
R3
6
GND

31)


ix = 11.999 A
iy = 11.999 A
ix == iy
R1
4
R4
3
XMM1
11.999A
V
120
R2
18
R3
6
-
+
GND

GEEKDAY

•3.1



$R_{es} = 10\Omega$

$V_{es} = 120V$

$i_s = 12A$

$i_1 = 4A \quad i_2 = 8A$

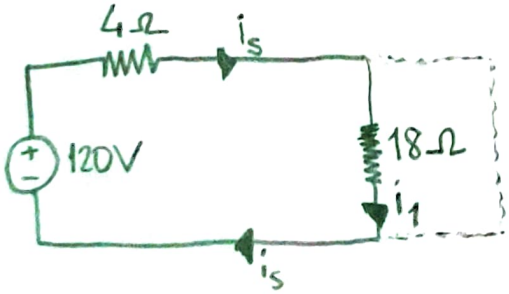
a) current flows through x and y junctions must be equal according to K.C.L.

$$i_x = i_s = \frac{V_{es}}{Res} = \frac{120}{10} = 12A$$

$i_x = i_y$

$$i_y = i_1 + i_2 = \frac{V_{xy}}{R_1} + \frac{V_{xy}}{R_2} = \frac{72}{18} + \frac{72}{9} = 12A$$

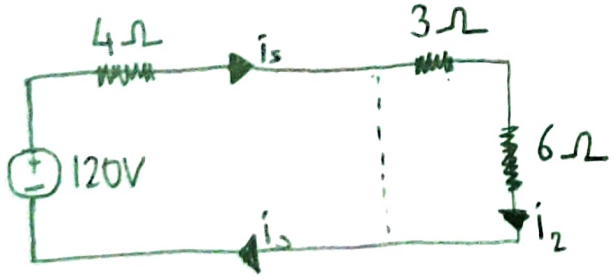
b)



$120V = i_s . R_s + i_1 . R_1$

$= 12.4 + 4.18$

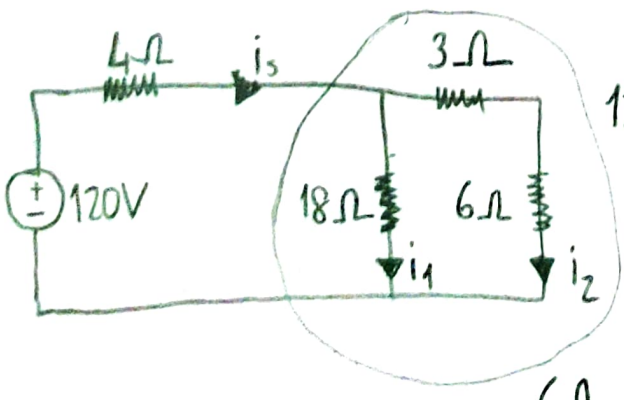
$= 48 + 72 = 120V$ //



$120V = i_s . R_s + i_2 . (R_2 + R_3)$

$= 12.4 + 8.(3+6)$

$= 48 + 72 = 120V$ //



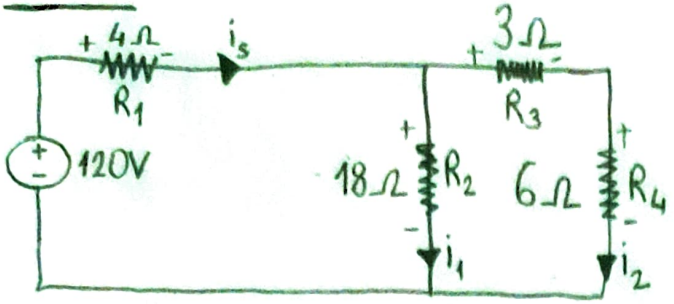
$120V = i_s . R_s + i_s . R_{es}$

$= 12.4 + 12.6$

$= 48 + 72$

$= 120V$ //

• 3.2



$V_s = 120V$

$R_s = 10\Omega$

$i_s = 12A$

$i_1 = 4A \quad i_2 = 8A$

a)

For R_1

$V_1 = i_s . R_1$

$= 12 . 4$

$= 48V$

$P_1 = -V_1 . i_s$

$= -48 . 12$

$= -576W$

For R_2

$V_2 = i_1 . R_2$

$= 4 . 18$

$= 72V$

$P_2 = -V_2 . i_1$

$= -72 . 4$

$= -288W$

For R_3

$V_3 = i_2 . R_3$

$= 8 . 3$

$= 24V$

$P_3 = -V_3 . i_2$

$= -24 . 8$

$= -192W$

For R_4

$V_4 = i_2 . R_4$

$= 8 . 6$

$= 48V$

$P_4 = -V_4 . i_2$

$= -48 . 8$

$= -384W$

b) $P_s = V_s . i_s$

$= 120 . 12$

$= 1440W$

c) $P_s + (P_1 + P_2 + P_3 + P_4) = 0$

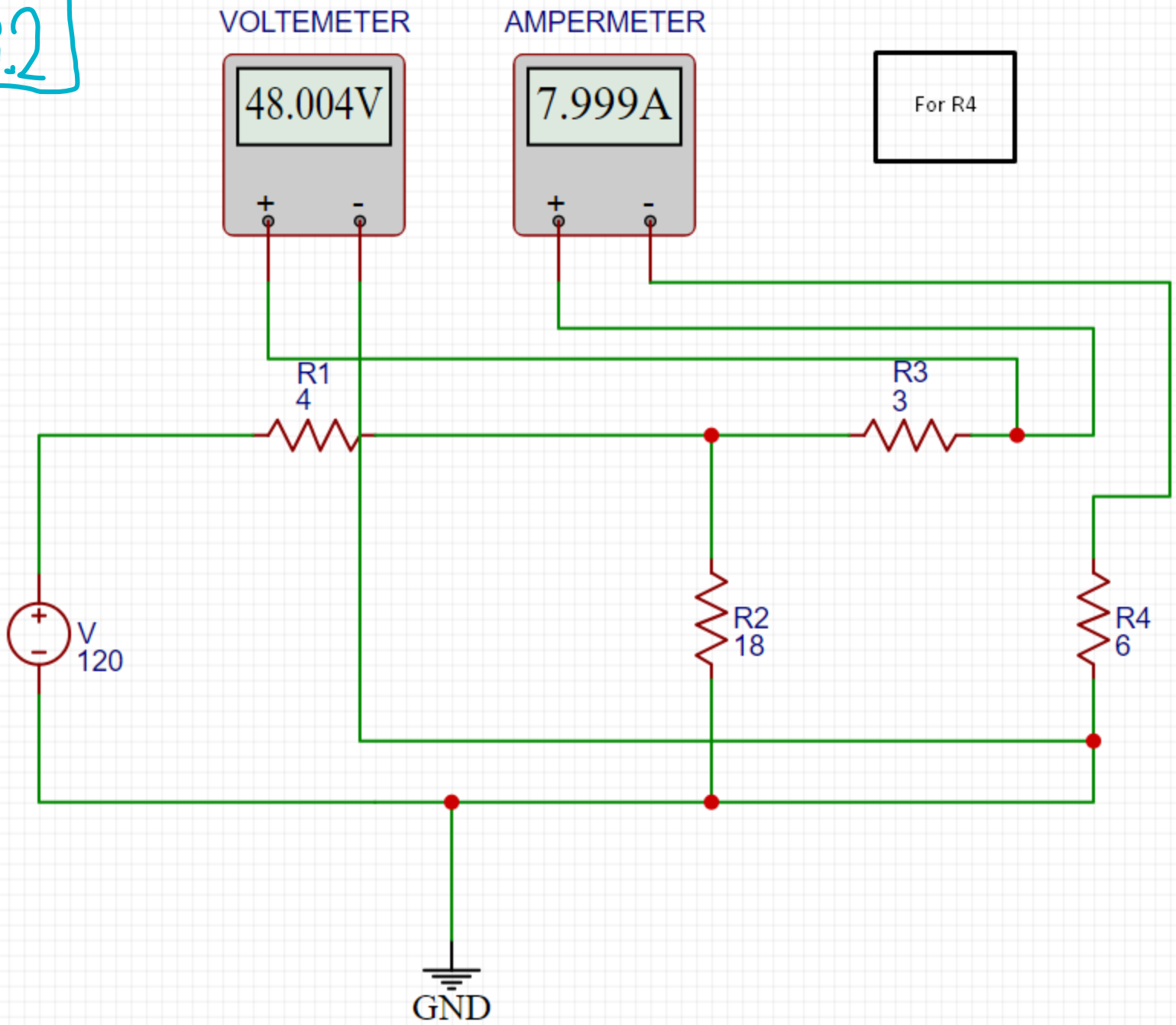
$P_s = -(P_1 + P_2 + P_3 + P_4)$

$1440 = -(-576 - 288 - 192 - 384)$

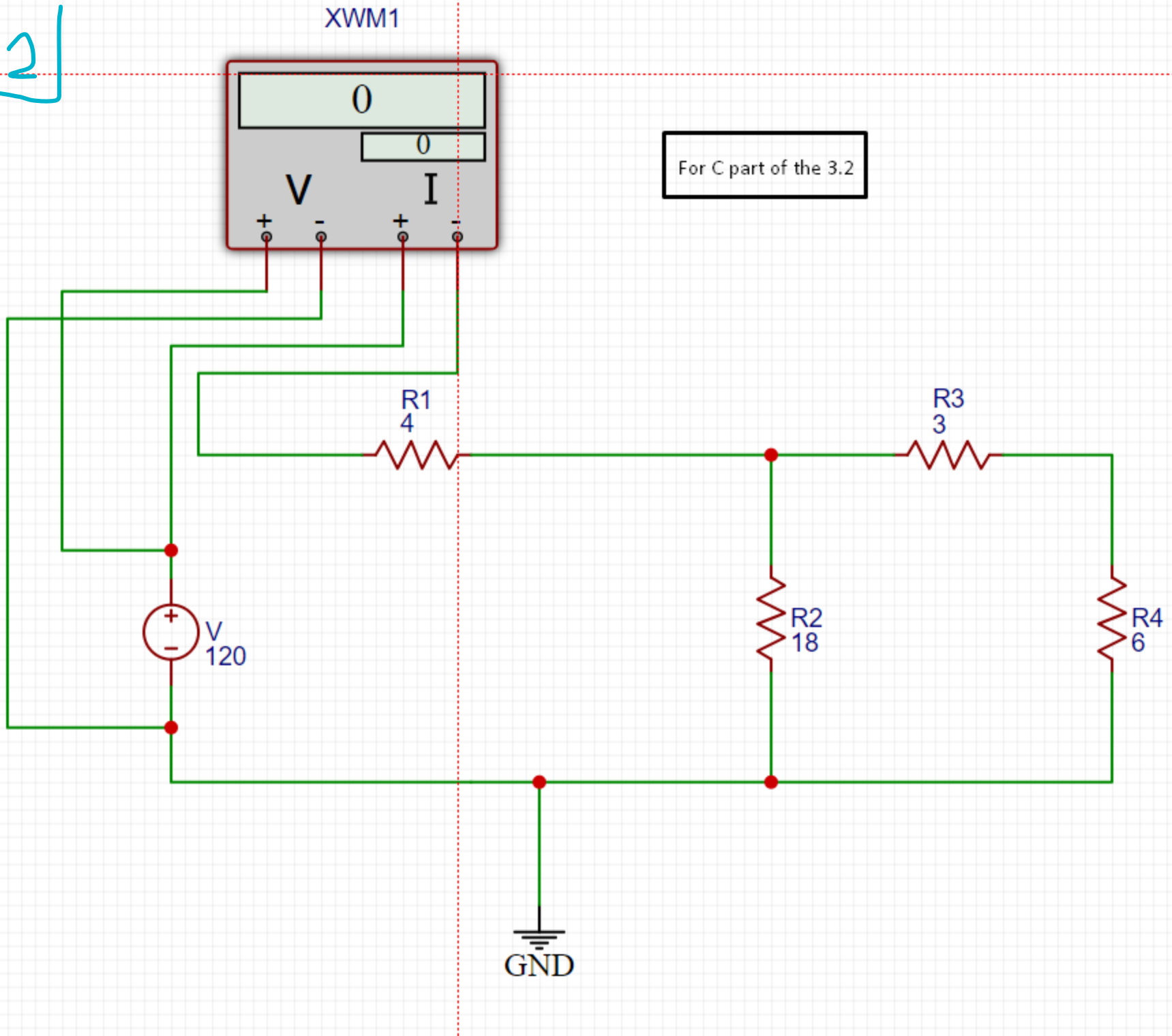
$1440 = -(-1440)$

$1440 = 1440$ //

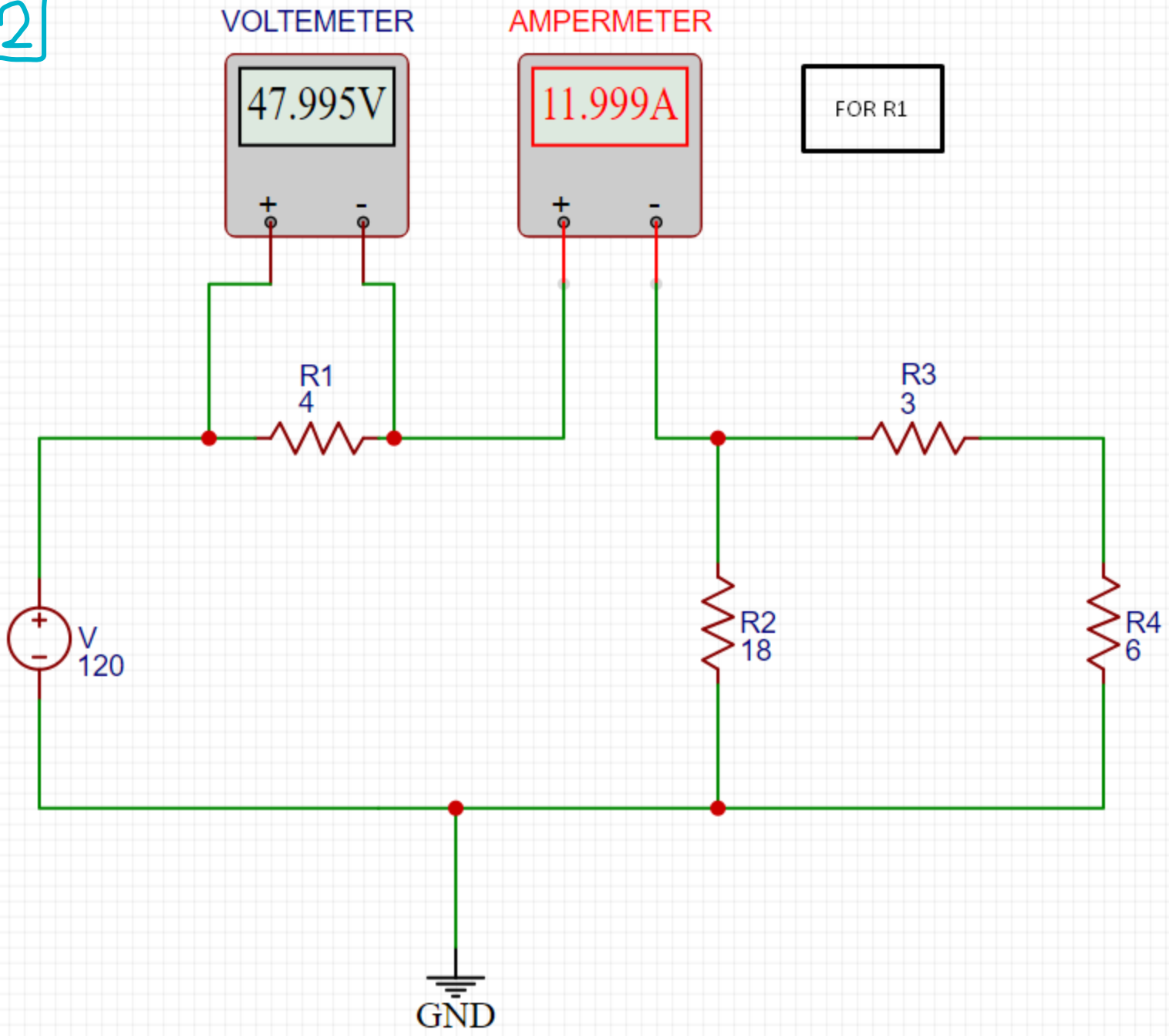
3.2


VOLTEMETER
AMPERMETER
48.004V
7.999A
+
-
+
-
For R4
R1
4
R3
3
R2
18
R4
6
V
120
GND

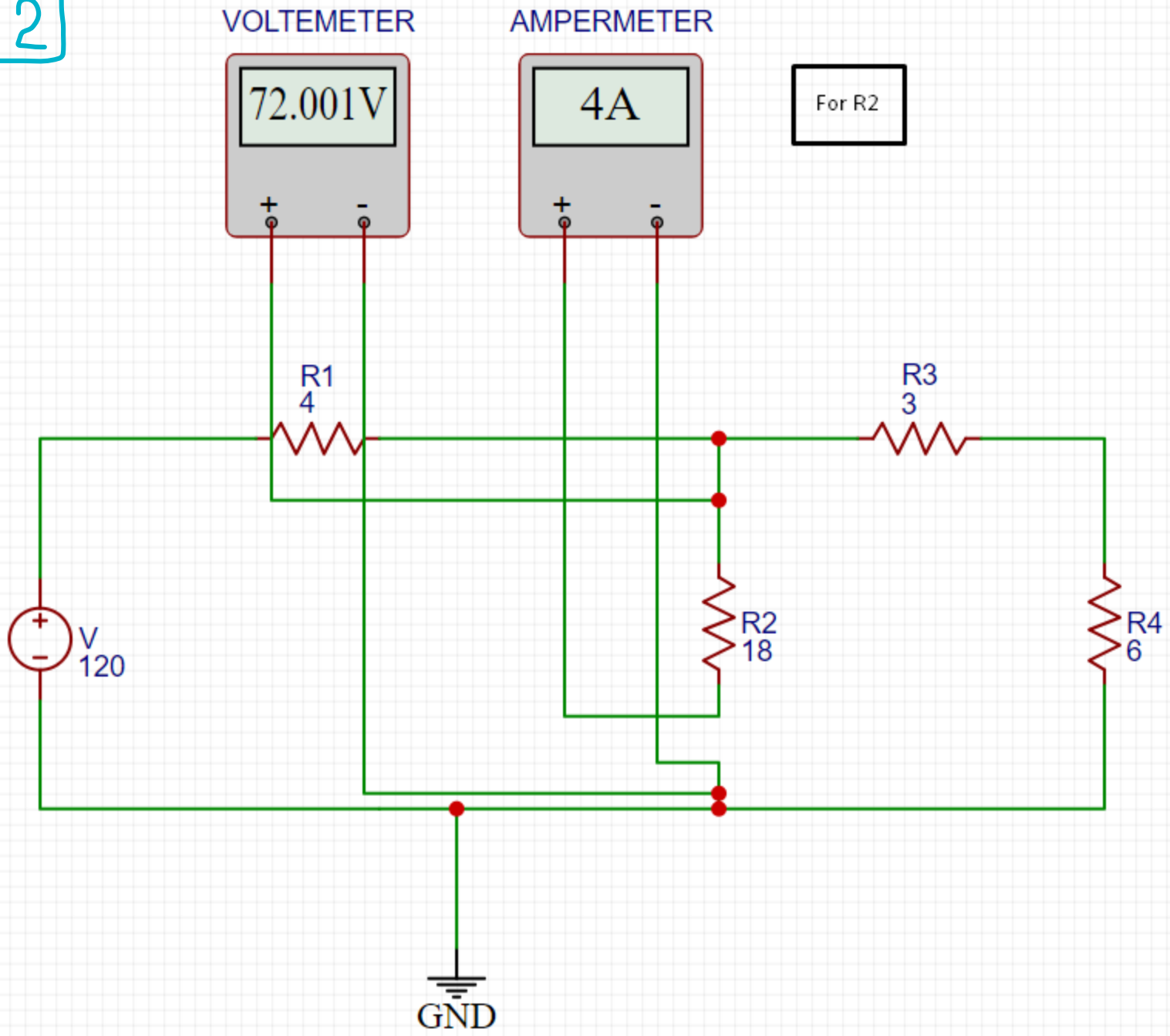
3.2



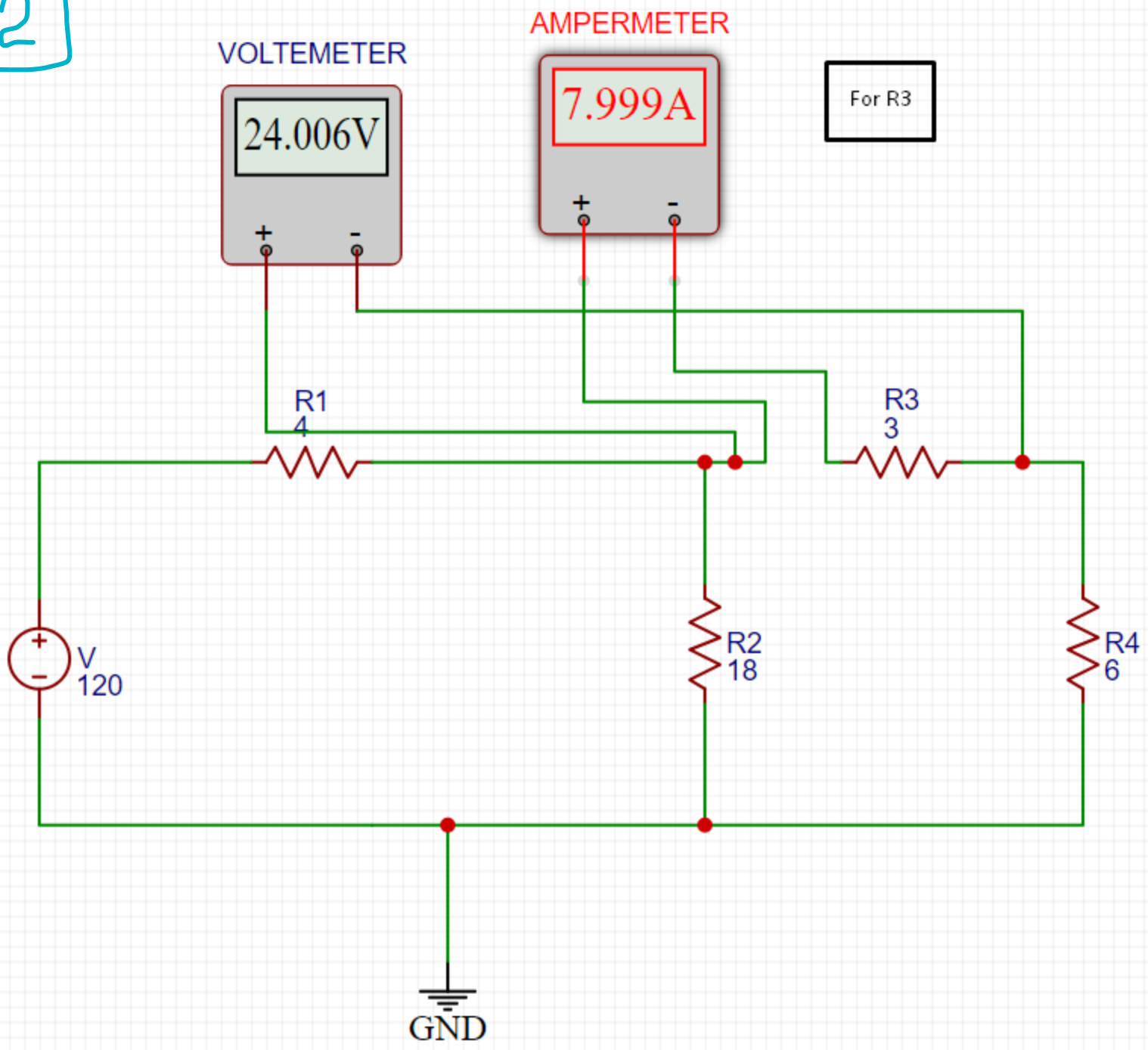
3.2


VOLTEMETER
AMPERMETER
47.995V
11.999A
FOR R1
+
-
+
-
R1
4
R3
3
R2
18
R4
6
V
120
GND

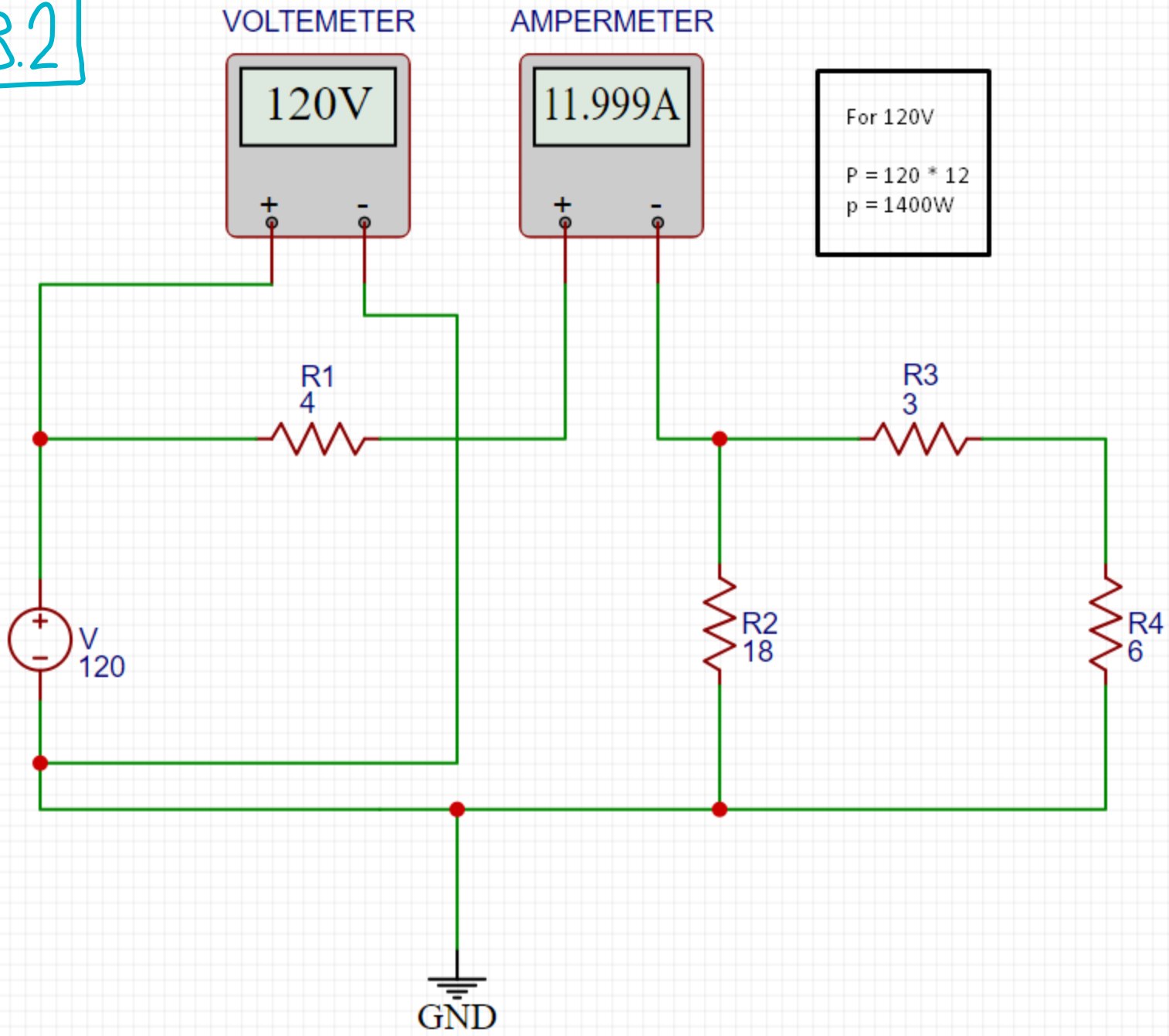
32


VOLTEMETER
AMPERMETER
72.001V
4A
For R2
+
-
+
-
R1
4
R3
3
R2
18
R4
6
V
120
GND

32


VOLTEMETER
24.006V
+
-
AMPERMETER
7.999A
+
-
For R3
R1
4
R3
3
R2
18
R4
6
V
120
GND

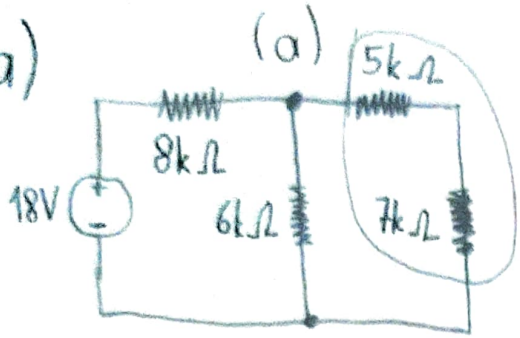
3.2

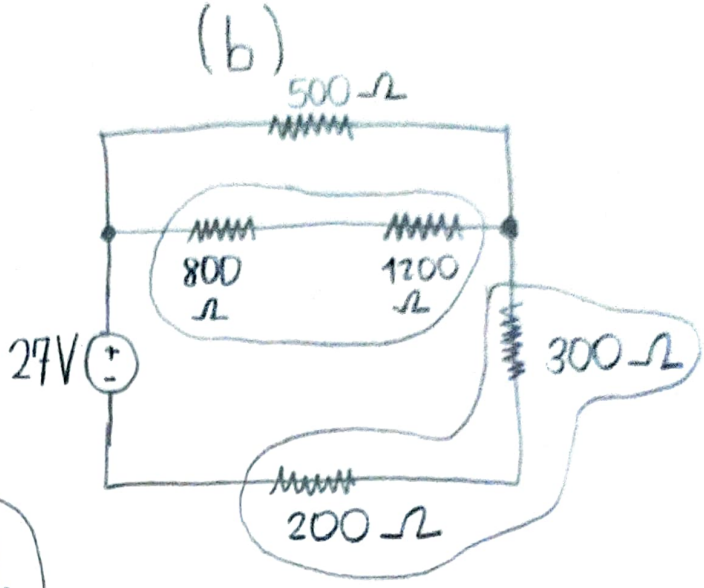

VOLTEMETER
AMPERMETER
120V
11.999A
+
-
+
-
For 120V
P = 120 * 12
p = 1400W
R1
4
R3
3
R2
18
R4
6
V
120
GND

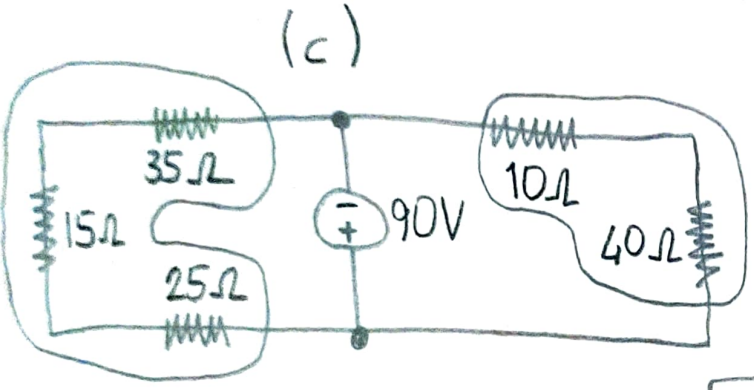
GEEKDAY

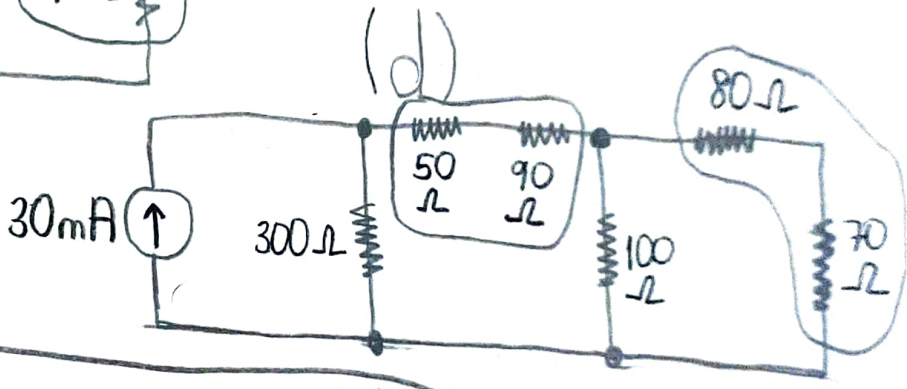
• 3.3

a)

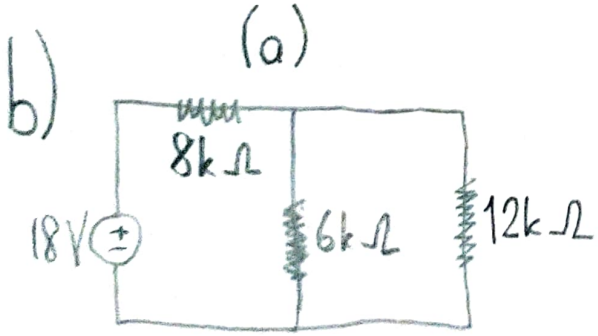


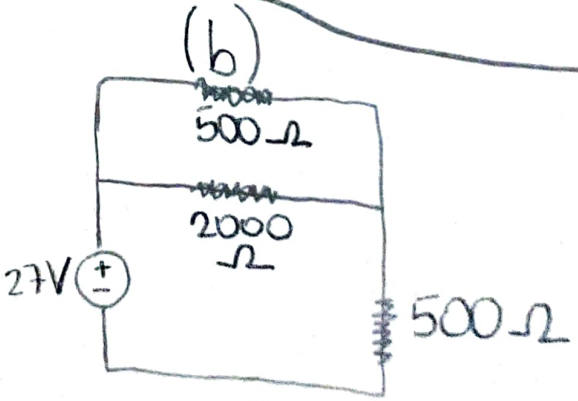


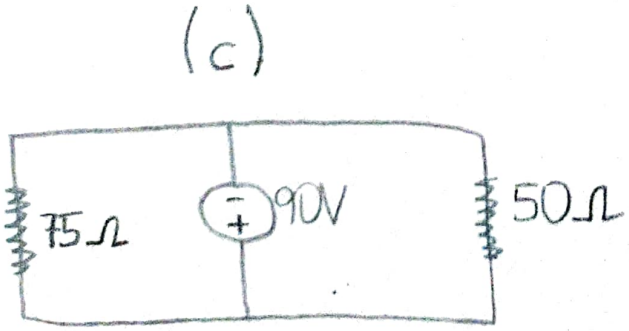


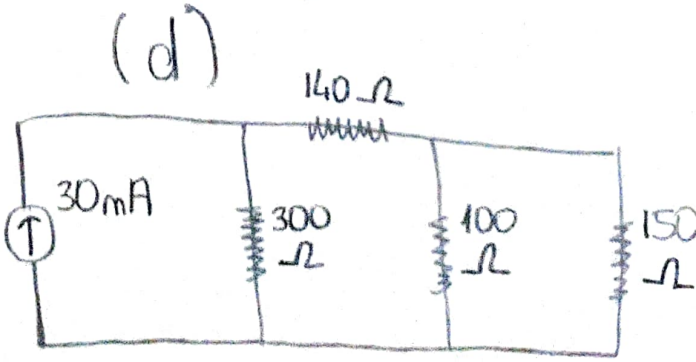


b)









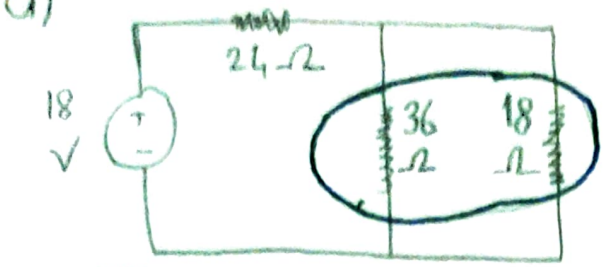
• 3.4

seri → pink

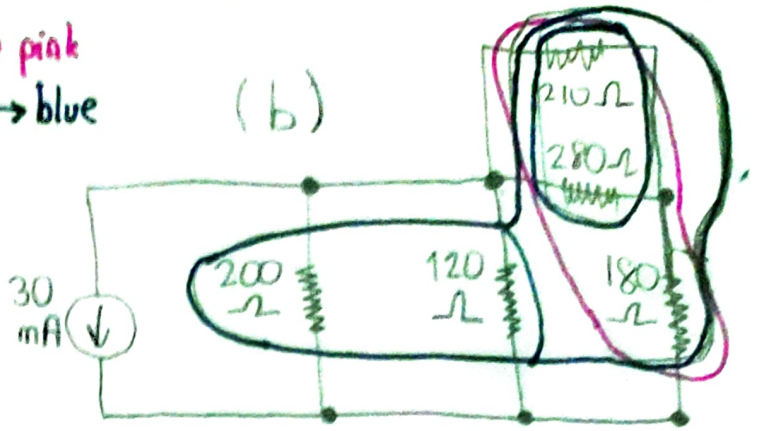
paralel → blue

a)

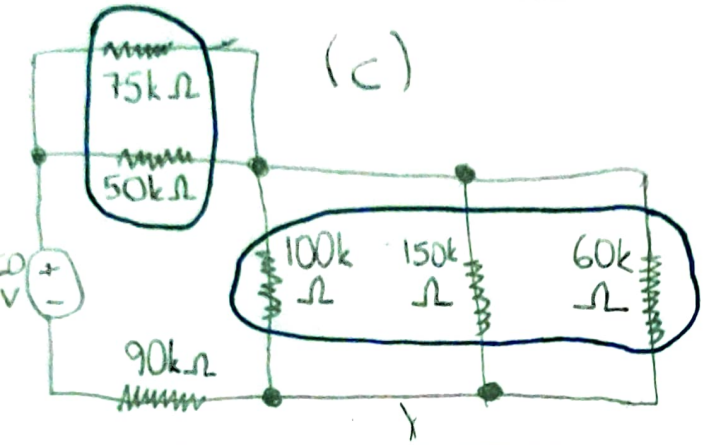
(a)



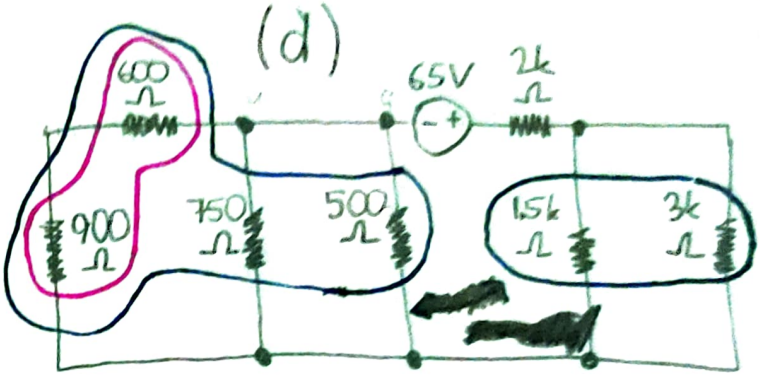
(b)



(c)

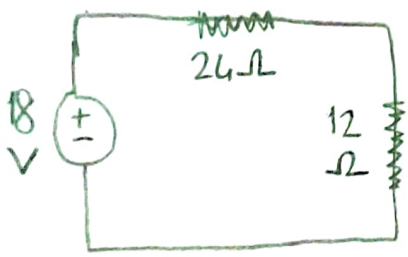


(d)



b)

(a)

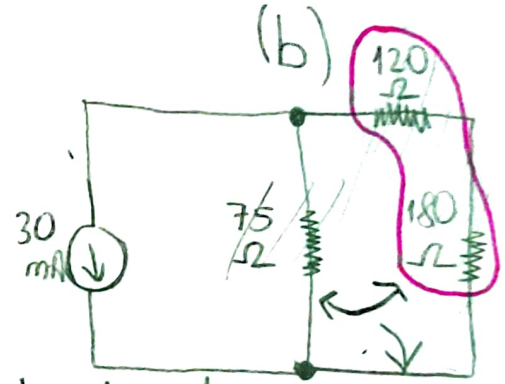


$\frac{1}{R} = \frac{1}{36} + \frac{1}{18}$

$\frac{1}{R} = \frac{3}{36}$

$R = 12\,\Omega$

(b)



$\frac{1}{R_1} = \frac{1}{200} + \frac{1}{120}$

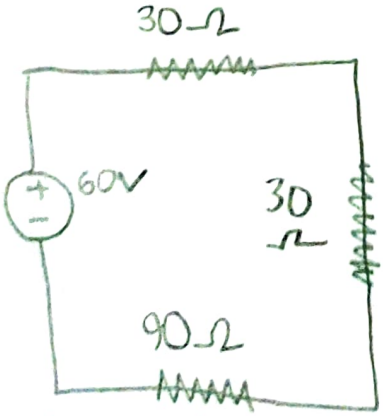
$R_1 = 75\,\Omega$

$\frac{1}{R_2} = \frac{1}{210} + \frac{1}{280}$

$R_2 = 120\,\Omega$

$\frac{1}{R_3} = \frac{1}{75} + \frac{1}{(120+180)} \Rightarrow R_3 = 60\,\Omega$

(c)



$\frac{1}{R_1} = \frac{1}{75} + \frac{1}{50}$

$R_1 = 30\,\Omega$

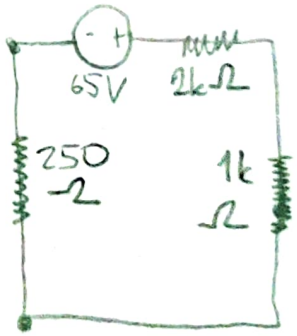
$\frac{1}{R_2} = \frac{1}{100} + \frac{1}{150} + \frac{1}{60}$

$R_2 = 30\,\Omega$

(d)

$\frac{1}{R_1} = \frac{1}{1.5k} + \frac{1}{3k}$

$R_1 = 1k\,\Omega$



$\frac{1}{R_2} = \frac{1}{(900+600)} + \frac{1}{750} + \frac{1}{500}$

$1/R_2 = \frac{6}{1500}$

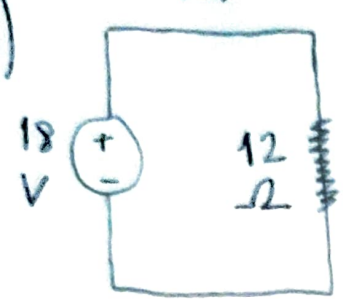
$R_2 = 250\,\Omega$

GEEKDAY

• 3.5

a)

(a)



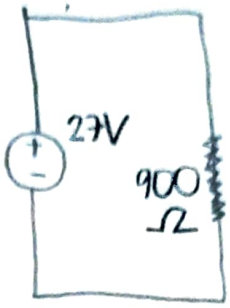
$\rightarrow R_1 = 5+7 = 12\,\Omega$

$\rightarrow \frac{1}{R_2} = \frac{1}{6} + \frac{1}{12}$

$R_2 = 4\,\Omega$

$\rightarrow R_{es} = 4+8 = 12\,\Omega$ //

(b)



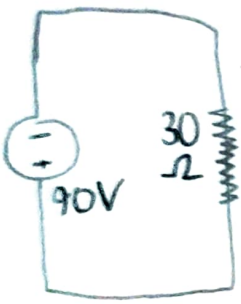
$\rightarrow R_1 = 800+1200 = 2000\,\Omega$

$\rightarrow \frac{1}{R_2} = \frac{1}{500} + \frac{1}{2000}$

$R_2 = 400\,\Omega$

$\rightarrow R_{es} = 400+300+200 = 900\,\Omega$ //

(c)



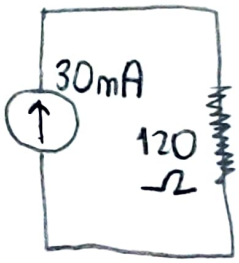
$\rightarrow R_1 = 35+15+25 = 75\,\Omega$

$\rightarrow R_2 = 10+40 = 50\,\Omega$

$\rightarrow \frac{1}{R_{es}} = \frac{1}{50} + \frac{1}{75}$

$R_{es} = 30\,\Omega$ //

(d)



$\rightarrow R_1 = 80+70 = 150\,\Omega$

$\rightarrow \frac{1}{R_2} = \frac{1}{150} + \frac{1}{100}$

$R_2 = 60\,\Omega$

$\rightarrow R_3 = 60+50+90 = 200$

$R_{es} = 120\,\Omega$

$\rightarrow \frac{1}{R_{es}} = \frac{1}{200} + \frac{1}{300}$

b)

For (a)

$i_a = \frac{V_a}{R_a} = \frac{18}{12} = 1.5A$

$P_a = V_a \cdot i_a$

$= 18 \cdot (1,5A)$

$= 27W$ //

For (b)

$i_b = \frac{V_b}{R_b} = \frac{27}{900}$

$P_b = V_b \cdot i_b$

$= \frac{27 \cdot 27}{900}$

$= 0,81W$ //

For (c)

$i_c = \frac{V_c}{R_c} = \frac{90}{30} = 3A$

$P_c = V_c \cdot i_c$

$= 90 \cdot 3$

$= 270W$

For (d)

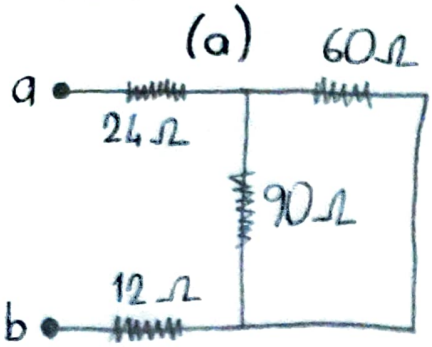
$V_d = i_d \cdot R_d = (0.030) \times 120$

$= 3,6V$

$P_d = V_d \cdot i_d = (3,6) \times (0,030) = 0,108W$ //

• 3.8

(a)



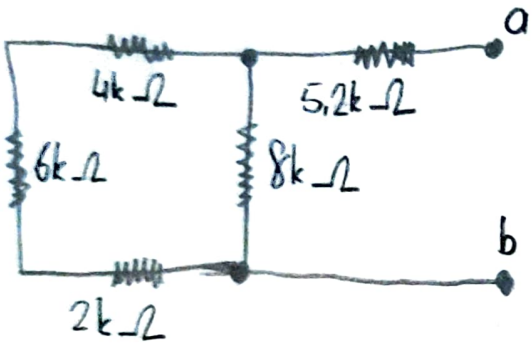
$\rightarrow \frac{1}{R_1} = \frac{1}{60} + \frac{1}{90}$

$R_1 = 36\Omega$

$\rightarrow R_{ab} = 24 + 36 + 12$

$= 72\Omega$

(b)



$\rightarrow R_1 = 4k + 6k + 2k$

$= 12k\Omega$

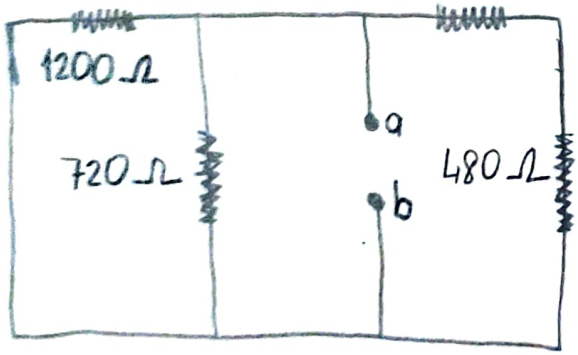
$\rightarrow \frac{1}{R_2} = \frac{1}{12k} + \frac{1}{8k}$

$R_2 = \frac{24}{5} k\Omega = 4,8k\Omega$

$\rightarrow R_{es} = 5,2k + 4,8k$

$= 10k\Omega$

(c)

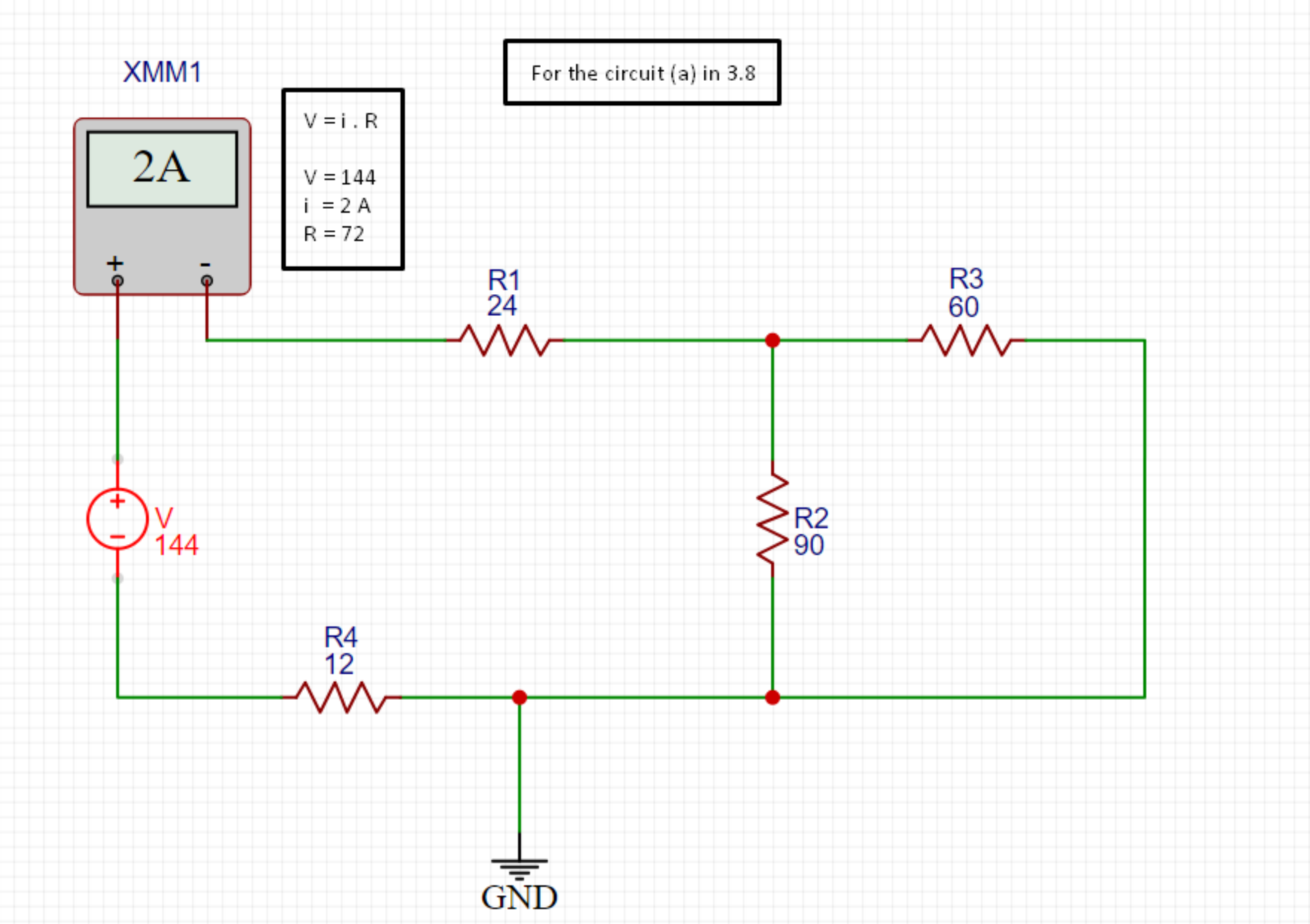


$\rightarrow R_1 = 320 + 480$

$= 800\Omega$

$\rightarrow \frac{1}{R_{es}} = \frac{1}{1200} + \frac{1}{800} + \frac{1}{720}$

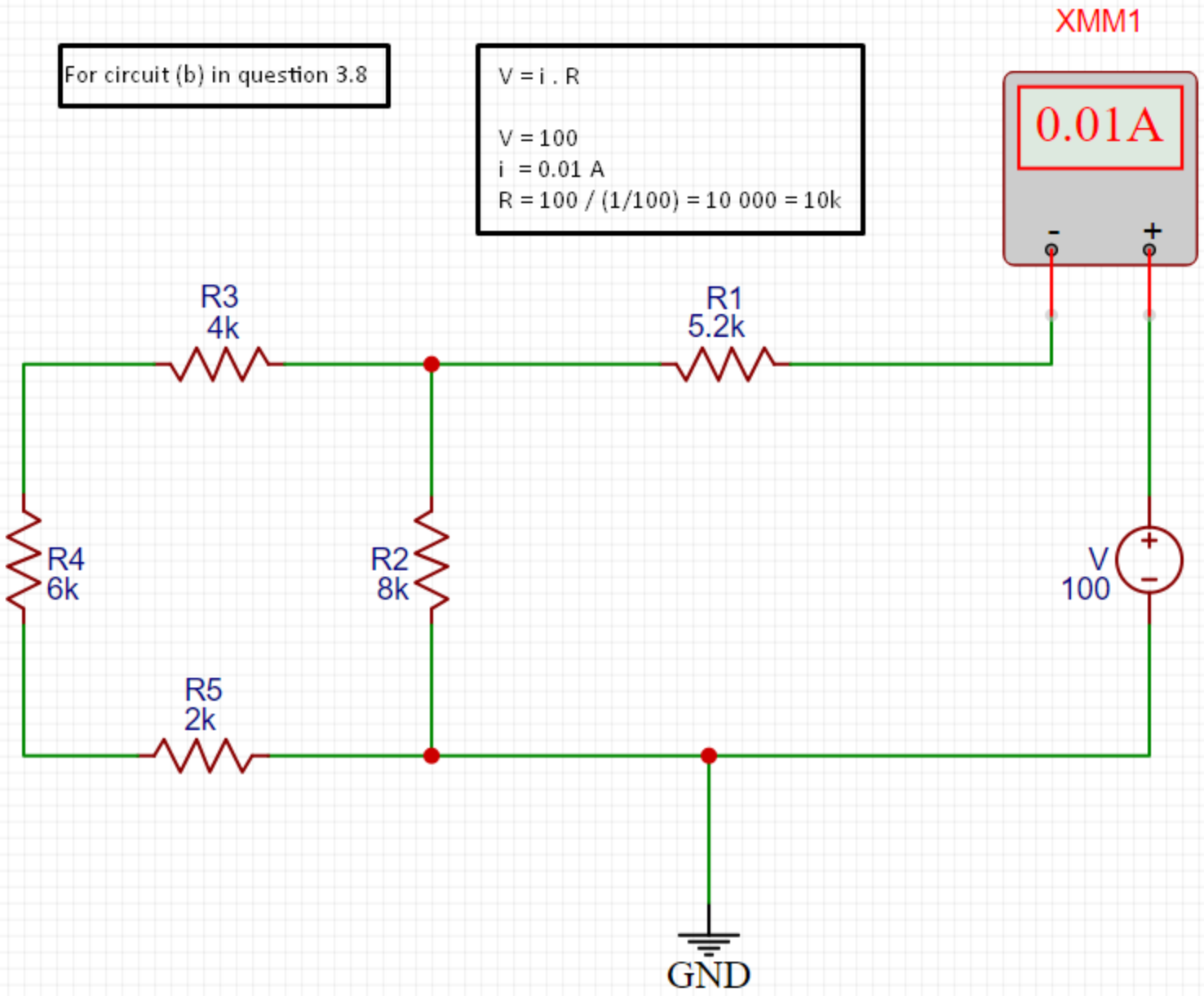
$R_{es} = 288\Omega$

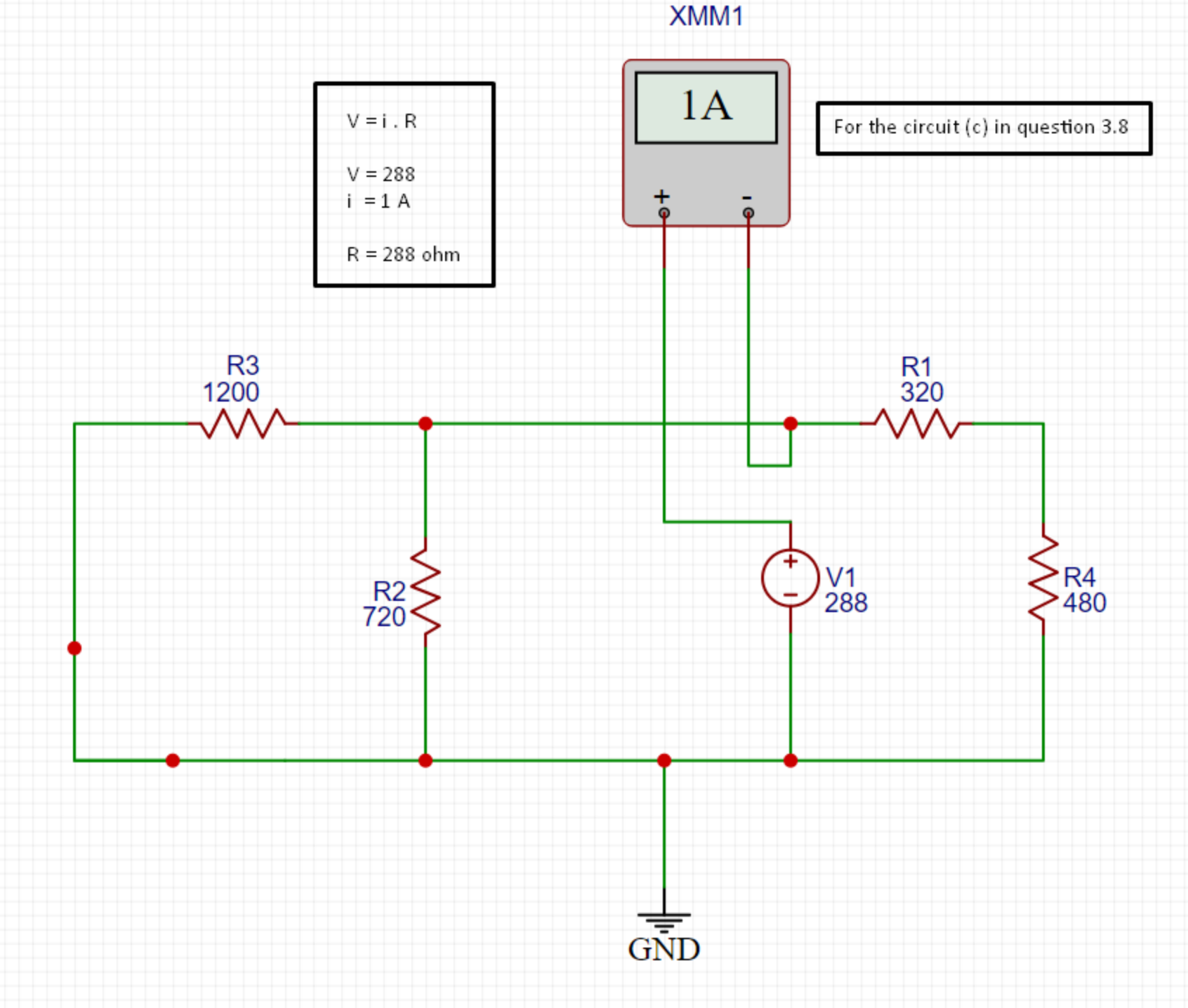

XMM1
2A
+
-
V = i . R
V = 144
i = 2 A
R = 72
For the circuit (a) in 3.8
R1
24
R3
60
R2
90
V
144
R4
12
GND

For circuit (b) in question 3.8

V = i . R

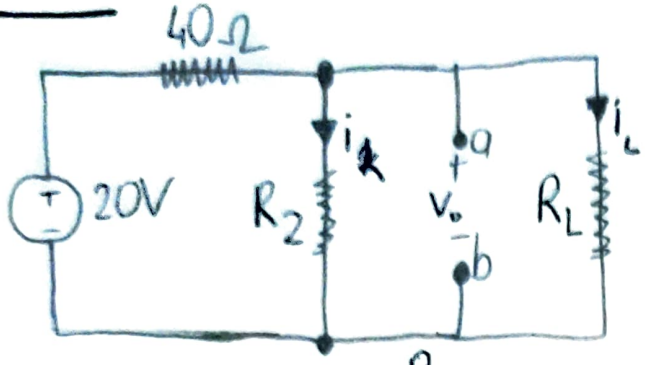
V = 100
i = 0.01 A
R = 100 / (1/100) = 10 000 = 10k




XMM1
1A
+
-
V = i . R
V = 288
i = 1 A
R = 288 ohm
For the circuit (c) in question 3.8
R3
1200
R1
320
R2
720
V1
288
R4
480
GND

GEEKDAY

• 3.13



* $i_2 = i_1 + i_L$, $i_L = \frac{R_2}{R_2+R_L} \times i_2$

* $i_L = \frac{10}{10+R_L} \times (0,425)$

* $3 = i_L \cdot R_L$

* $3 = \frac{(4,25)}{10+R_L} \times R_L$

* $30 + 3R_L = (4,25)R_L$

* $30 = 1,25\,R_L$

* $R_L = 24\,\Omega$

* $20 = \underbrace{(40 \cdot i_1)}_{4V} + (R_2 \cdot i_1)$

$16 = (40 \cdot i_1)$

$i_1 = 0,4A$

* $20 = \underbrace{(40 \cdot i_2)}_{3V} + (R_{2L} \cdot i_2)$

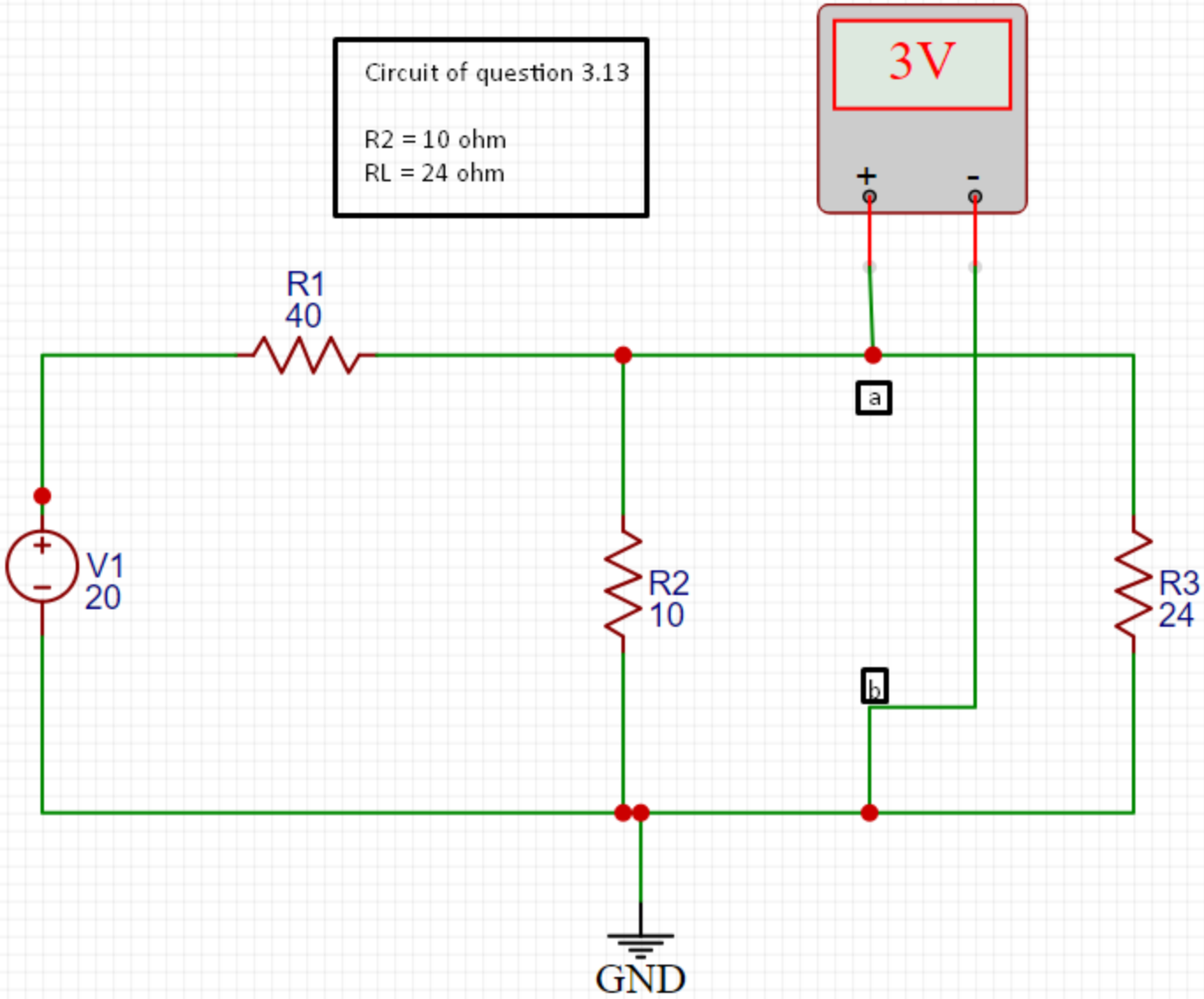
$17 = (40, i_2)$

$i_2 = 0,425A$

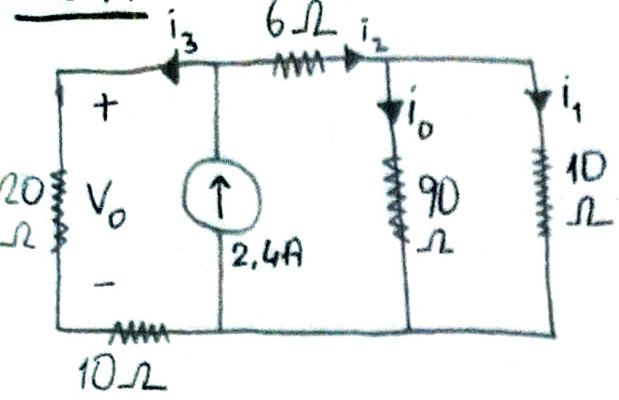
* $4 = R_2 \cdot i_1$

$4 = R_2 (0,4)$

$R_2 = 10\,\Omega$


Circuit of question 3.13
R2 = 10 ohm
RL = 24 ohm
3V
+
-
R1
40
a
V1
20
R2
10
R3
24
b
GND

• 3.17



a) $i_0 = 0,16A$

$V_0 = 24V$

b) $p = -15,36W$

c) $p = 25,6W$

* $\frac{1}{R_1} = \frac{1}{10} + \frac{1}{90} = \frac{10}{90}$

* $R_1 = 9\Omega$

* $R_2 = 9 + 6 = 15\Omega$

* $R_3 = 20 + 10 = 30\Omega$

* $i_2 = \frac{30}{15+30} \times (2,4) = \frac{2}{3} \cdot \frac{24}{10} = \frac{16}{10} = 1,6A$

* $i_0 = \frac{10}{90+10} \times i_2 = \frac{1}{10} \times \frac{16}{10} = 0,16A$ //

* $2,4 = i_3 + i_2 = i_3 + 1,6$

$i_3 = 0,8A$

* $V_0 = i_3 . R_3 = (0,8).(30) = 24V$ //

* $p = -V . i_2 = -(R . i_2) . i_2$

$= -(6.(1,6)).(1,6)$

$= -15,36W$ //

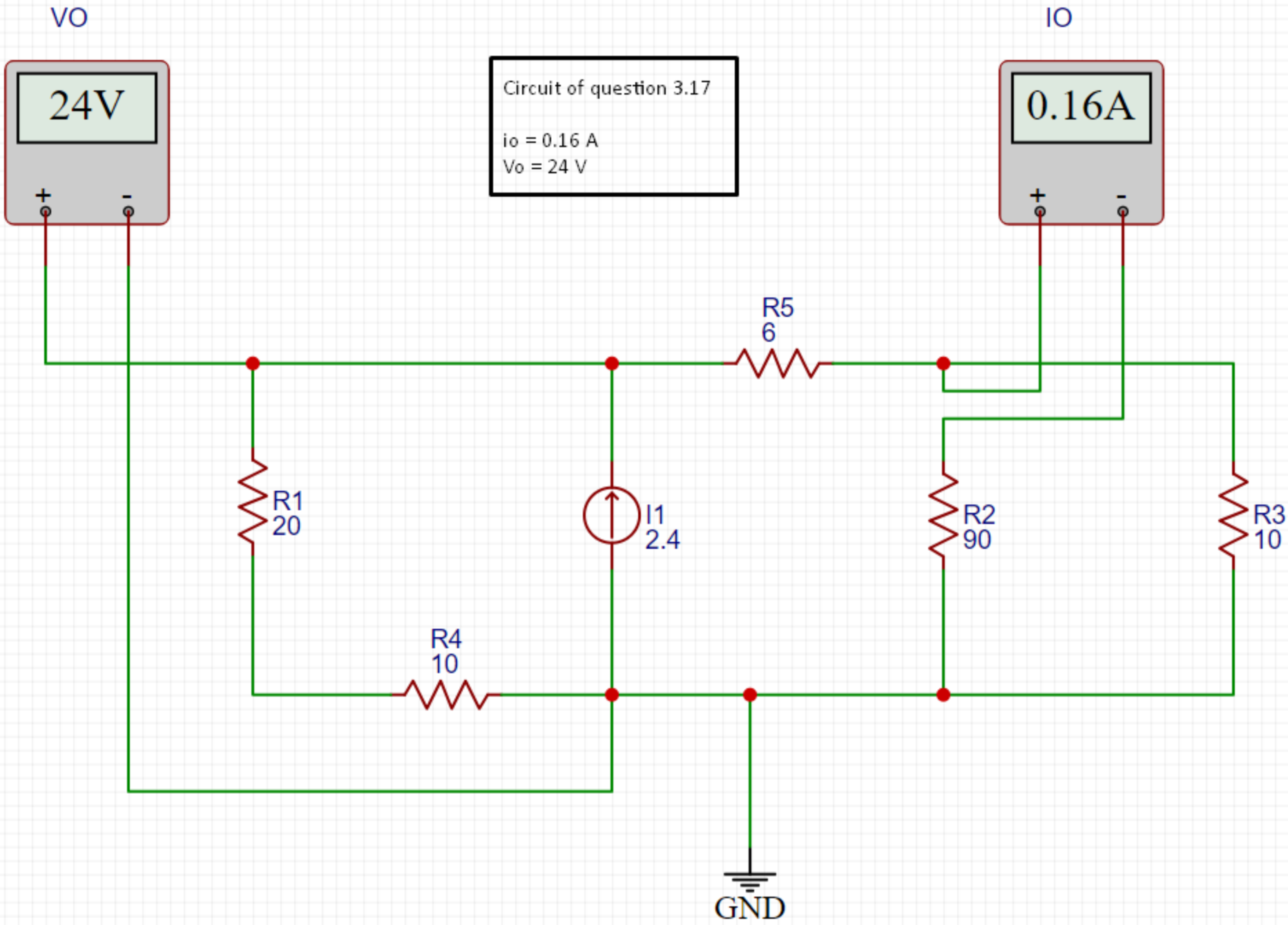
$\frac{1}{R} = \frac{1}{15} + \frac{1}{30} = \frac{3}{30}$

$R = 10\Omega$

* $P = V . i = (R . i) . i = R . i^2$

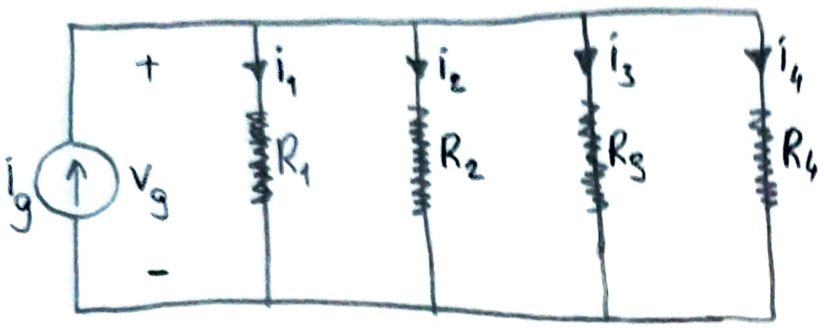
$p = 10 . (1,6)^2$

$= 25,6W$


VO
IO
24V
0.16A
+
-
+
-
Circuit of question 3.17
io = 0.16 A
Vo = 24 V
R5
6
R1
20
I1
2.4
R2
90
R3
10
R4
10
GND

GEEKDAY

• 3.18



* $V_g = i_g \cdot R_{es}$

$25 = 0{,}05 \cdot R_{es}$

$R_{es} = 500\,\Omega$

$i_1 = 3x = 5mA$

$i_2 = 5x = \frac{25}{3}\,mA$

$i_3 = 10x = \frac{50}{3}\,mA$

$i_4 = 12x = 20mA$

$R_1 = 5000\,\Omega$

$R_2 = 3000\,\Omega$

$R_3 = 1500\,\Omega$

$R_4 = 1250\,\Omega$

* $i_g = i_1 + i_2 + i_3 + i_4$

$50mA = 30x$

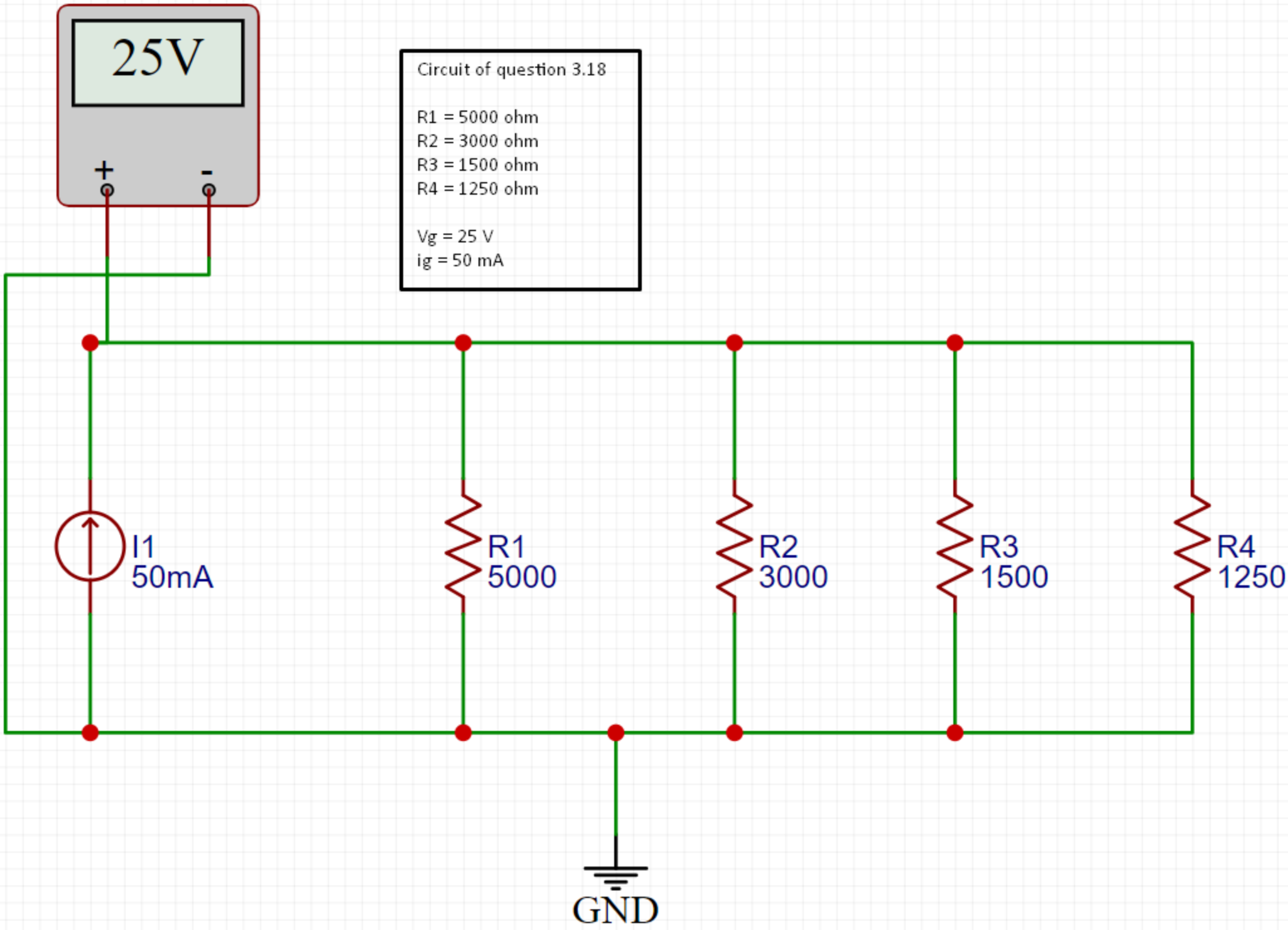
$x = \frac{5}{3}\,mA$

* $R_1 = \frac{V_g}{i_1} = \frac{25}{0{,}005} = 5000\,\Omega$

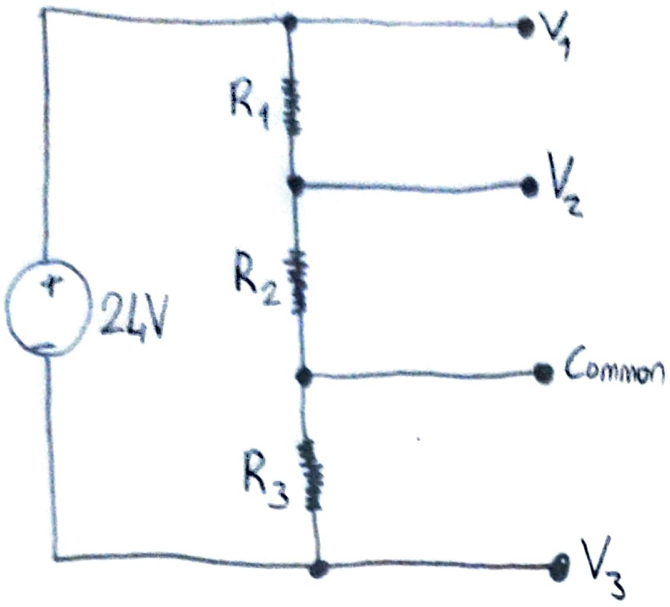
* $R_2 = \frac{V_g}{i_2} = \frac{25}{\frac{25}{3} \cdot 0{,}001} = 3000\,\Omega$

* $R_3 = \frac{V_g}{i_3} = \frac{25}{\frac{50}{3} \cdot 0{,}001} = 1500\,\Omega$

* $R_4 = \frac{V_g}{i_4} = \frac{25}{0{,}02} = \frac{2500}{2} = 1250\,\Omega$


25V
+
-
Circuit of question 3.18
R1 = 5000 ohm
R2 = 3000 ohm
R3 = 1500 ohm
R4 = 1250 ohm
Vg = 25 V
ig = 50 mA
I1
50mA
R1
5000
R2
3000
R3
1500
R4
1250
GND

• 3.19



$R_1 = 2{,}1\ \Omega$

$R_2 = 1{,}5\ \Omega$

$R_3 = 3{,}6\ \Omega$

a) $P = V \cdot i$

$80 = 24 \cdot i$

$i = \frac{10}{3} A$

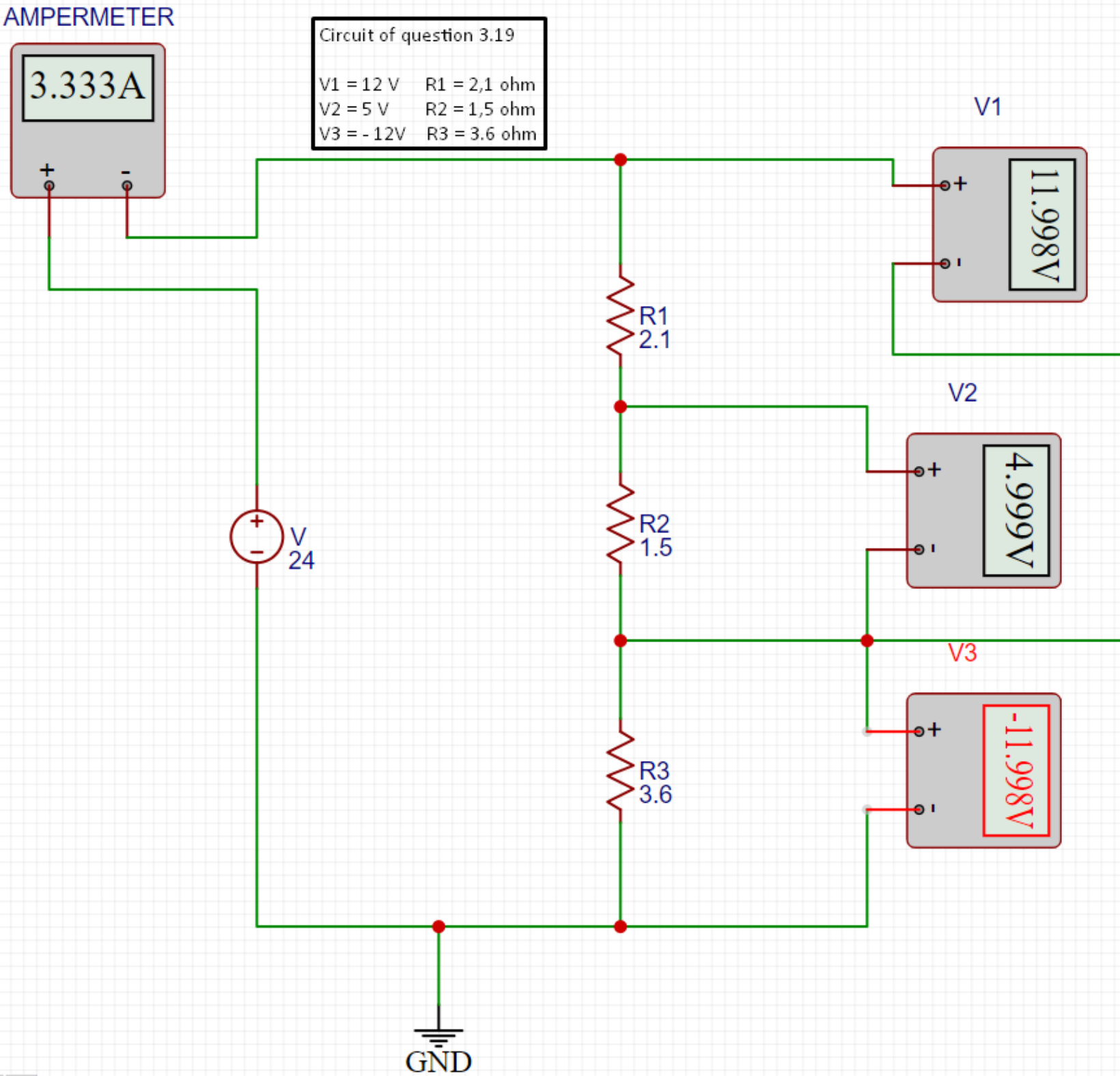
$R_{es} = \frac{V}{i} = \frac{24}{10/3} = 7{,}2\ \Omega$

$R_{es} = R_1 + R_2 + R_3 = 7{,}2\ \Omega$

b) $V_1 = i \cdot (R_1 + R_2) \Rightarrow R_1 + R_2 = \frac{12}{10/3} = 3{,}6\ \Omega$

$V_2 = i \cdot R_1 \Rightarrow R_1 = \frac{5}{10/3} = 1{,}5\ \Omega$

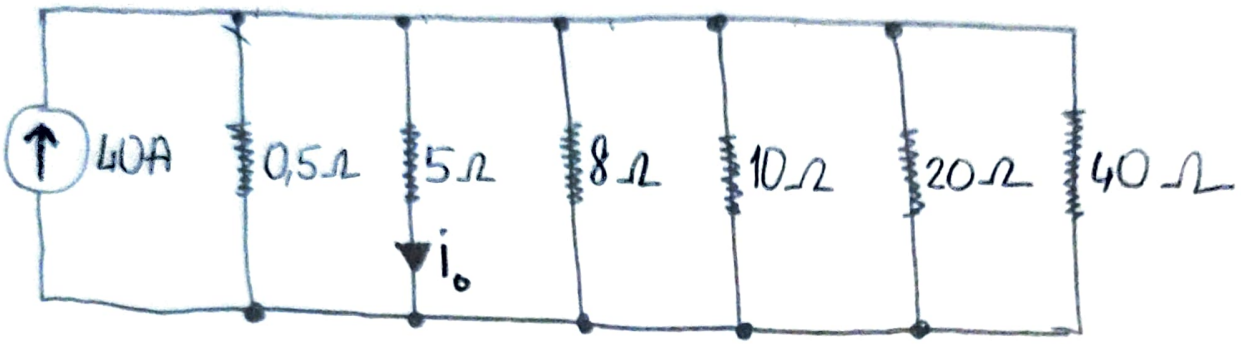
$V_3 = i \cdot R_3 \Rightarrow R_3 = \frac{12}{10/3} = 3{,}6\ \Omega$


AMPERMETER
3.333A
+
-
Circuit of question 3.19
V1 = 12 V R1 = 2,1 ohm
V2 = 5 V R2 = 1,5 ohm
V3 = - 12V R3 = 3.6 ohm
V1
11.998V
R1
2.1
V2
4.999V
R2
1.5
V
24
V3
-11.998V
R3
3.6
GND

GEEKDAY

• 3.22

(b)



a) $i_k = \dfrac{i_g G_k}{G_1 + G_2 + \dots + G_k + \dots + G_N}$

* $G_1 + G_2 + \dots G_k + \dots + G_N = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dots \dfrac{1}{R_N} = \dfrac{1}{R_{eş}} = \dfrac{1}{V_g/i_g} = \dfrac{i_g}{V_g}$

* $i_k = \dfrac{i_g \cdot G_k}{i_g/V_g} = G_k \cdot V_g = \boxed{\dfrac{V_g}{R_k}}$ $\quad \boxed{V_g = i_k \cdot R_k}$

---

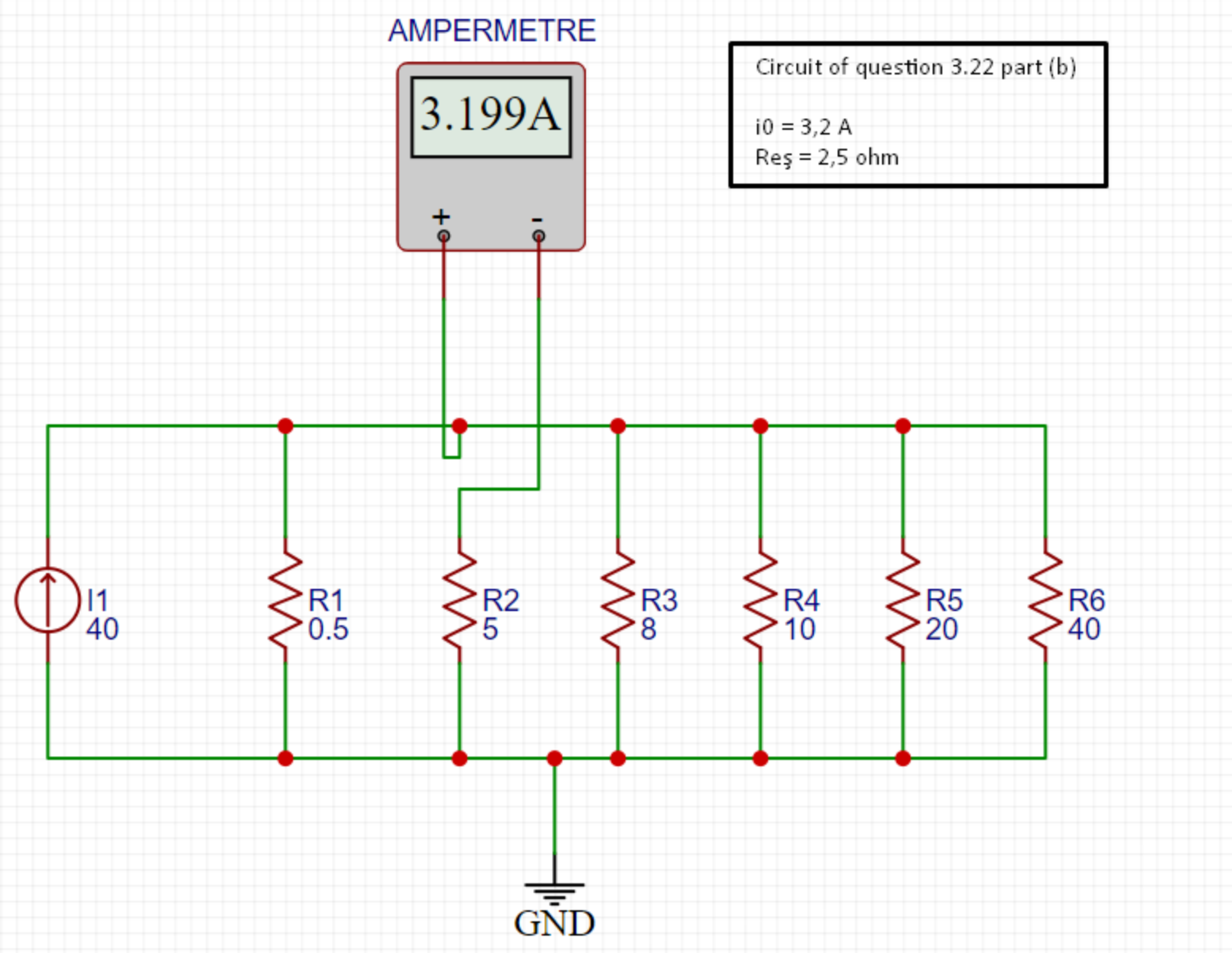
b) $i_0 = \dfrac{i \cdot G_0}{\underbrace{G_1 + G_2 + \dots + G_6}_{R_{eş}}}$ $\quad i = 40A$ $\quad G_0 = \dfrac{1}{5}$ $\quad R_{eş} = 2{,}5\,\Omega$

$i_0 = \dfrac{40 \cdot \frac{1}{5}}{\frac{25}{10}} = \dfrac{8.1}{25}$ $\quad \boxed{i_0 = 3{,}2A}$

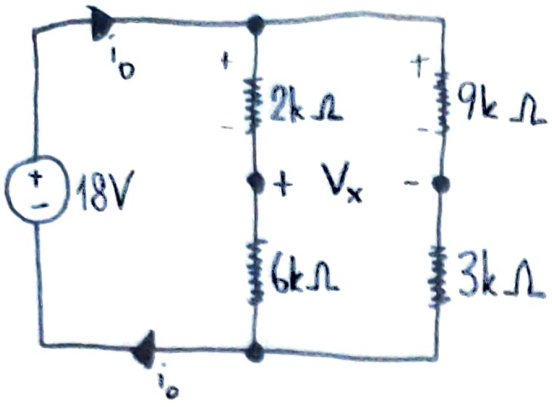
$\dfrac{1}{R_{eş}} = \dfrac{1}{0{,}5} + \dfrac{1}{5} + \dfrac{1}{8} + \dfrac{1}{10} + \dfrac{1}{20} + \dfrac{1}{40}$

$= \dfrac{80 + 8 + 5 + 4 + 2 + 1}{40}$

$= \dfrac{100}{40} = 2{,}5\,\Omega$


AMPERMETRE
3.199A
+
-
Circuit of question 3.22 part (b)
i0 = 3,2 A
Reş = 2,5 ohm
I1
40
R1
0.5
R2
5
R3
8
R4
10
R5
20
R6
40
GND

• 3.28



a) * $R_2 = 9k + 3k$
$= 12k\,\Omega$

* $R_1 = 2k + 6k$
$= 8k$

* $\frac{1}{R_{es}} = \frac{1}{12k} + \frac{1}{8k} = \frac{5}{24k}$

$R_{es} = 4{,}8\,\Omega$

* $i = \frac{V}{R} \Rightarrow i_o = \frac{18}{4{,}8k} = \frac{180}{48k} = 3{,}75\,mA$

* $i_1 = \frac{R_2}{R_1 + R_2} \cdot i_o = \frac{12k}{20k} \cdot 3{,}75 = 2{,}25\,mA$

* $i_2 = i_o - i_1 = 3{,}75 - 2{,}25 = 1{,}5\,mA$

* $V_x + (2k \cdot i_1) - (9k \cdot i_2) = 0$

$(2k \cdot i_1) = 2 \cdot (2{,}25) = 4{,}5\,V$

$(9k \cdot i_2) = 9 \cdot (1{,}5) = 13{,}5\,V$

$V_x = 13{,}5 - 4{,}5 = 9V$

b) $V_x + (2k \cdot i_1) - (9k \cdot i_2) = 0$

* $V_s - (2k \cdot i_1) - (6k \cdot i_1) = 0$

$V_s = 8k \cdot i_1 \Rightarrow \frac{V_s}{4} = 2k \cdot i_1$ //

* $V_s - (9k \cdot i_2) - (3k \cdot i_2) = 0$

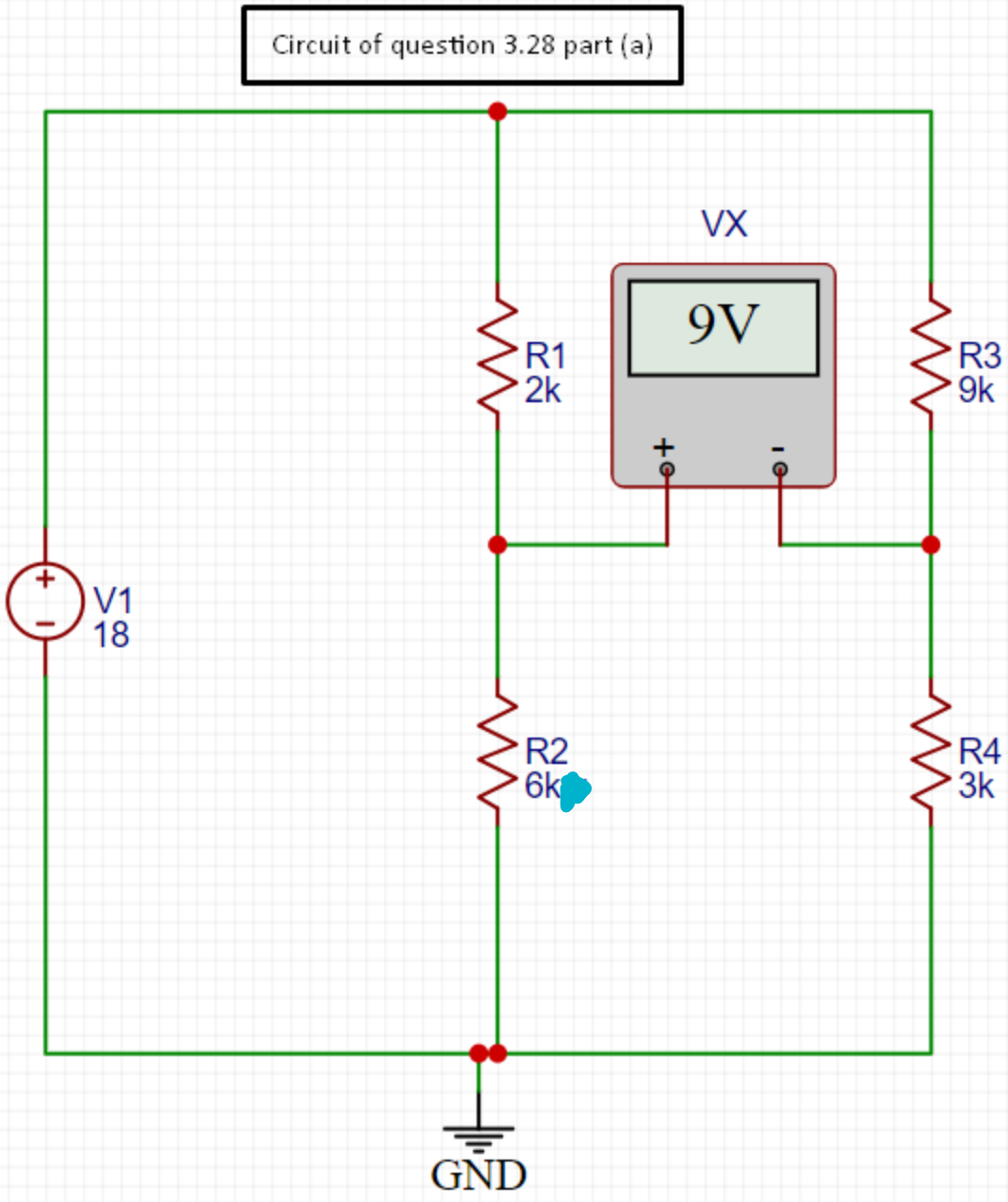
$V_s = 12k \cdot i_2 \Rightarrow \frac{4V_s}{3} = 9k \cdot i_2$ //

* $V_x + (2k \cdot i_1) - (9k \cdot i_2) = 0$

$V_x + \frac{V_s}{4} - \frac{4V_s}{3} = 0$

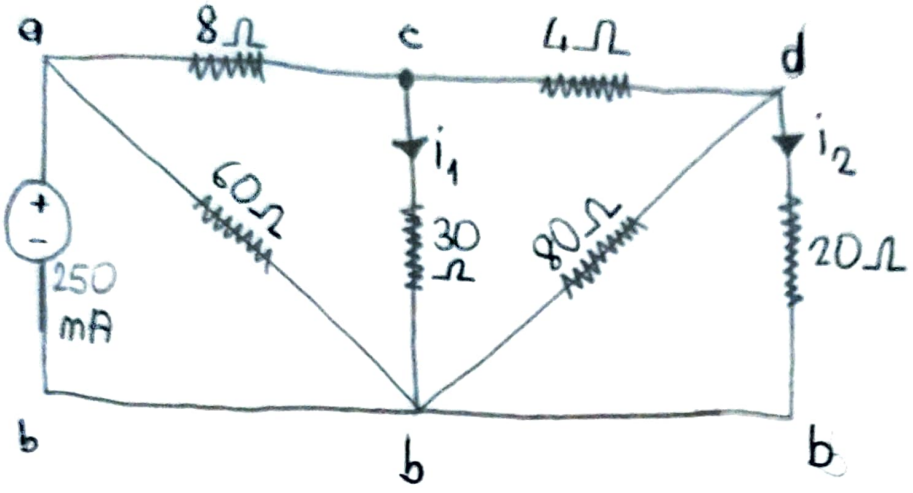
* $V_x = \frac{16V_s - 3V_s}{12} = \frac{13V_s}{12}$

$V_x = \frac{13V_s}{12}$


Circuit of question 3.28 part (a)
VX
9V
+
-
R1
2k
R3
9k
V1
18
R2
6k
R4
3k
GND

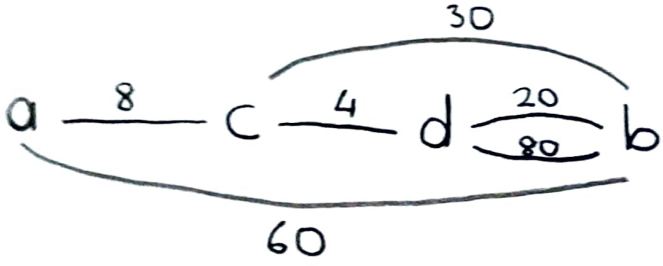
GEEKDAY

• 3.32



$i_1 = 75mA$

$i_2 = 90mA$



* $R_{db} = \frac{20.80}{100} = 16\Omega$

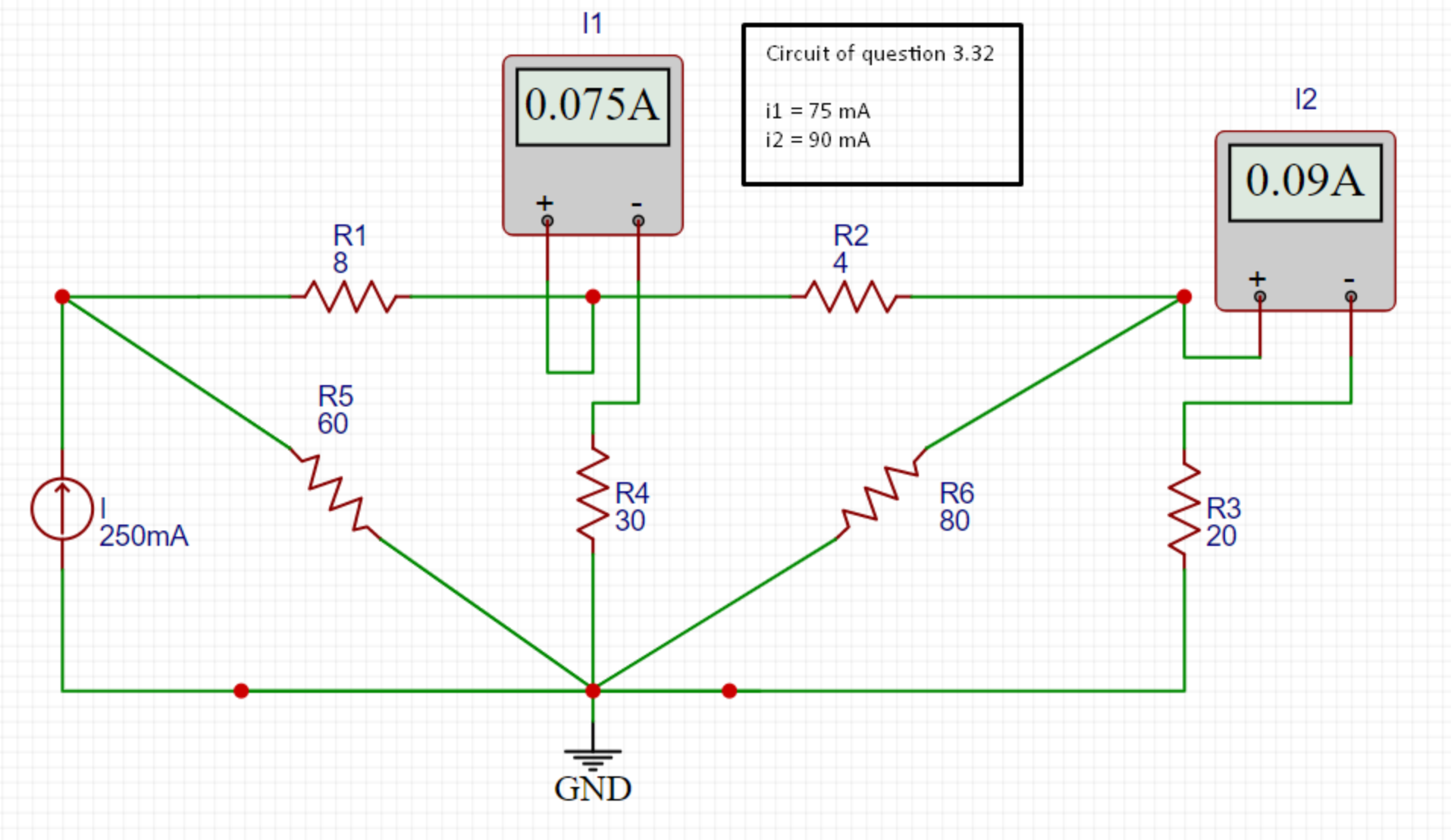
* $R_{cb} = \frac{30.(16+4)}{30+(16+4)} = \frac{30.20}{50} = 12\Omega$

* $i_{ac} = \frac{60}{60+(12+8)} \cdot 250 = \frac{3}{4} \cdot 250 = 187,5mA$

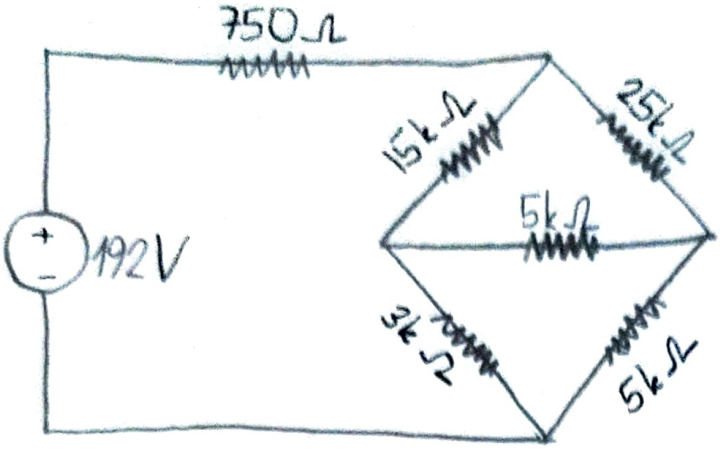
* $i_1 = \frac{20}{30+20} \cdot \frac{1875}{10} = \frac{2.1875}{50} = 75mA$ //

* $i_{cd} = 187,5 - 75 = 112,5mA$

* $i_2 = \frac{80}{20+80}(112,5) = \frac{8}{10} \cdot \frac{1125}{10} = 90mA$ //


I1
0.075A
+
-
Circuit of question 3.32
i1 = 75 mA
i2 = 90 mA
I2
0.09A
+
-
R1
8
R2
4
R5
60
R4
30
R6
80
R3
20
I
250mA
GND

• 3.52



* $R_1 = 25k + 5k = 30k\,\Omega$

* $R_2 = 15k + 3k = 18k\,\Omega$

* $R_{12} = \frac{18.30}{18+30} = \frac{3.30}{8} = 11,25k\,\Omega$

* $R_{es} = 0,75k + 11,25k = 12k\,\Omega$

* $i = \frac{V}{R} = \frac{192}{12k} = 16mA$

* $i_2 = \frac{30k}{18k+30k} . 16mA = \frac{30.16}{48}\,mA = 10mA$

* $V = i_2 \cdot R = (10mA).(3k\,\Omega)$

  $V = 30$

* $P = -V . i$

  $= -30 . 10mA$

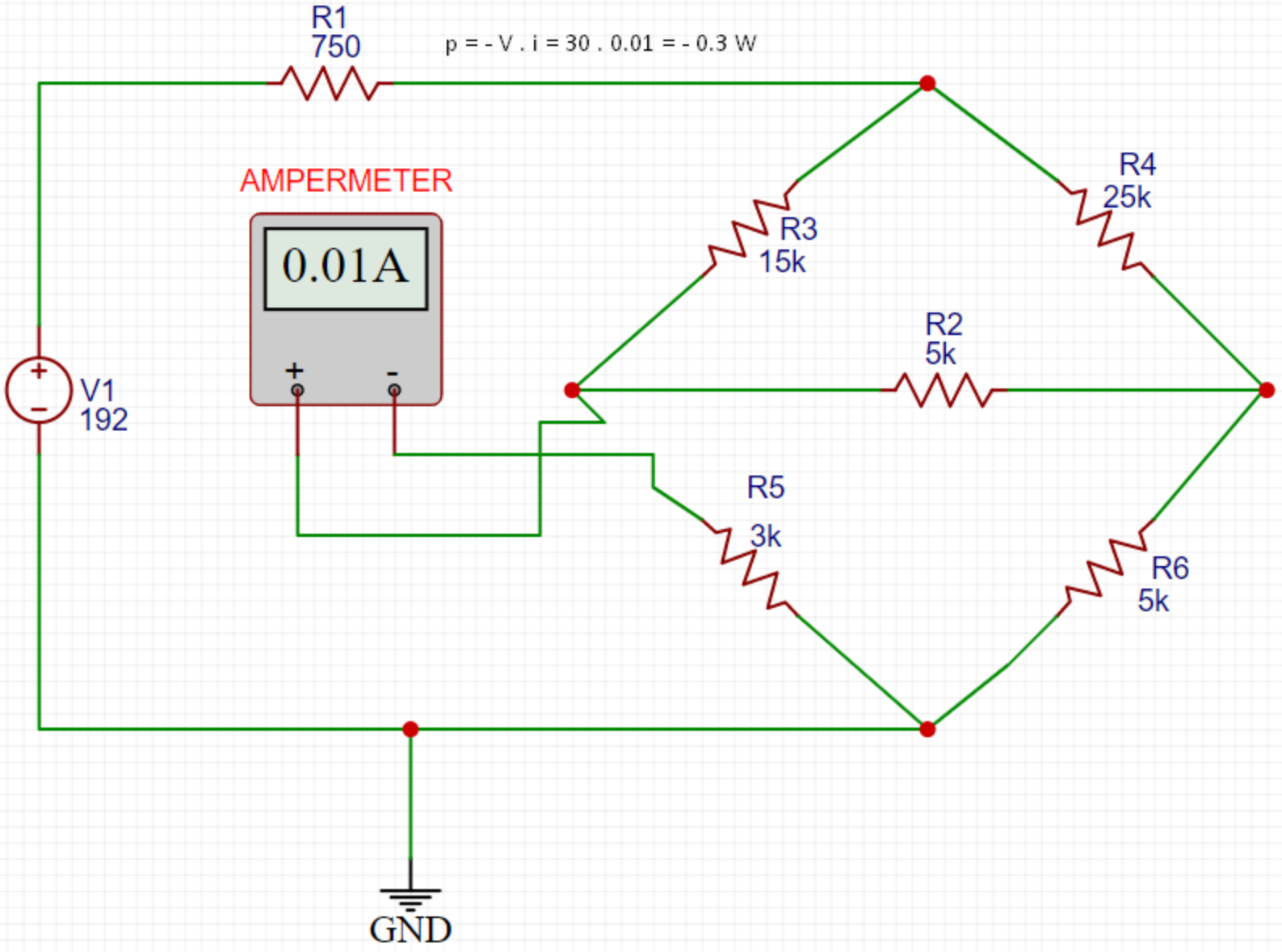
  $= -300mW$

  $= -0,3\,W$

Circuit of question 3.52

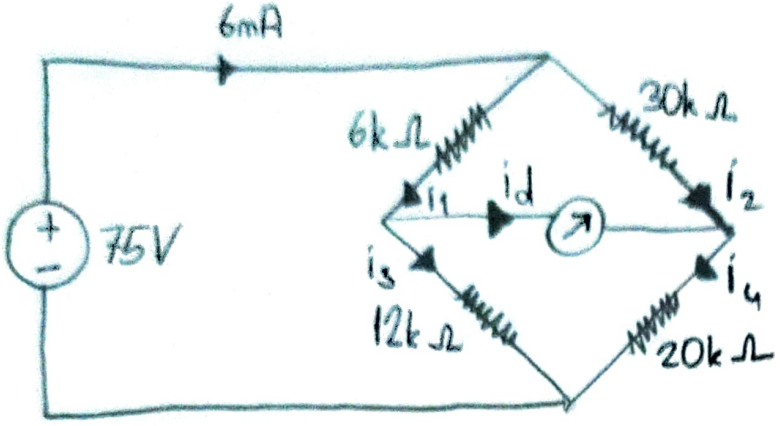
V = i . R
V = 0.01 . 3k = 30 v

p = - V . i = 30 . 0.01 = - 0.3 W



GEEKDAY

• 3.53



$i_1 = 5mA$

$i_2 = 1mA$

$i_3 = 3,75A$

$i_4 = 2,25A$

$id = i_1 - i_3 = i_4 - i_2$

$\boxed{id = 1,25\,mA}$

* $R_1 = \frac{6.30}{6+30} = \frac{180}{36} = 5k\,\Omega$

* $R_2 = \frac{12.20}{12+20} = \frac{240}{32} = 7,5k\,\Omega$

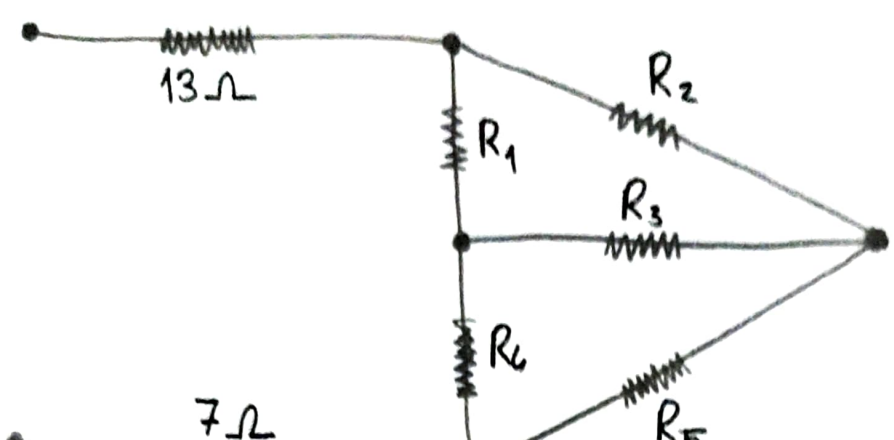
* $R_{es} = 5k + 7,5k = 12,5k\,\Omega$

* $i = \frac{V}{R} = \frac{75}{12,5k} = 6mA$

* $i_1 = \frac{30k}{30k+6k} \cdot 6mA = \frac{180}{36} = 5mA$ //

* $i_3 = \frac{20k}{20k+12k} \cdot 6mA = \frac{120}{32}\,mA = 3,75\,mA$

• 3.58



$R_1 = 50\,\Omega$

$R_2 = 25\,\Omega$

$R_3 = 50\,\Omega$

$R_4 = 20\,\Omega$

$R_5 = 30\,\Omega$

a)

* $R_A = \dfrac{R_3.R_2 + R_3.R_5 + R_2.R_5}{R_3} = \dfrac{50.25 + 50.30 + 25.30}{50}$

$R_A = 25 + 30 + 15 = 70\,\Omega$ //

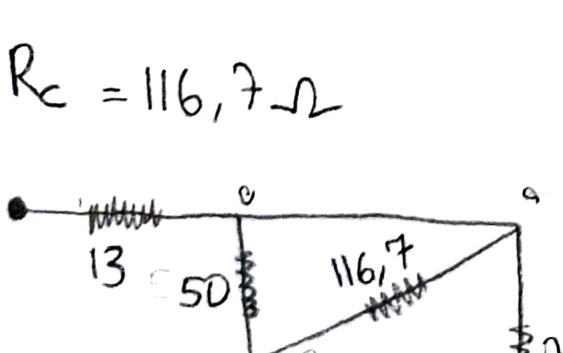
* $R_B = \dfrac{R_3.R_2 + R_3.R_5 + R_2.R_5}{R_2} = \dfrac{50.25 + 50.30 + 25.30}{25}$

$R_B = 50 + 60 + 30 = 140\,\Omega$ //

* $R_C = \dfrac{R_3.R_2 + R_3.R_5 + R_2.R_5}{R_5} = \dfrac{50.25 + 50.30 + 25.30}{30}$

$R_C = 116,7\,\Omega$

* $\dfrac{50.116,7}{166,7} = 35\,\Omega$

* 

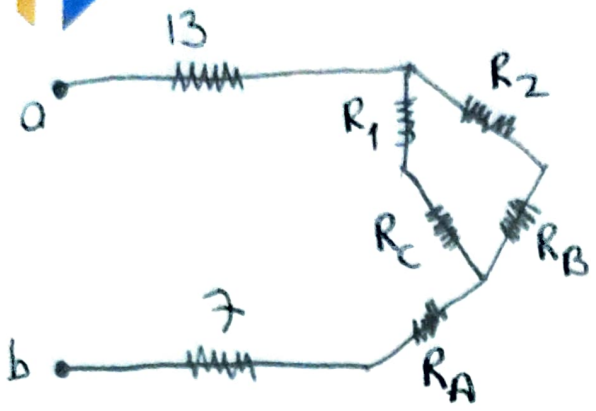
* $\dfrac{20.140}{160} = 17,5\,\Omega$

* $\dfrac{52,5.70}{122,5} = 30\,\Omega$

* $R_{AB} = 13 + 30 + 7 = 50\,\Omega$

GEEKDAY

b)



$$* R_A = \frac{20.30}{20+30+50} = 6\,\Omega$$

$$* R_B = \frac{50.30}{100} = 15\,\Omega$$

$$* R_C = \frac{20.50}{100} = 10\,\Omega$$

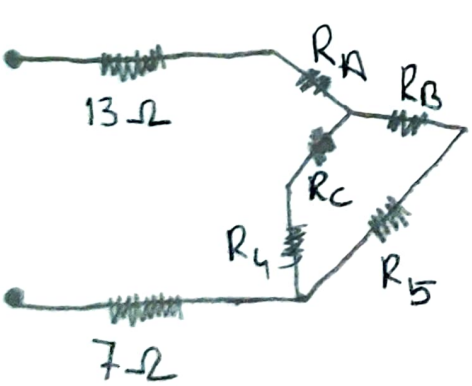
$$* R_1 + R_C = 50 + 10 = 60\,\Omega$$

$$* R_2 + R_B = 25 + 15 = 40\,\Omega$$

$$* \frac{40.60}{100} = 24\,\Omega$$

$$* R_{ab} = 24 + 6 + 13 + 7 = 50\,\Omega \;//$$

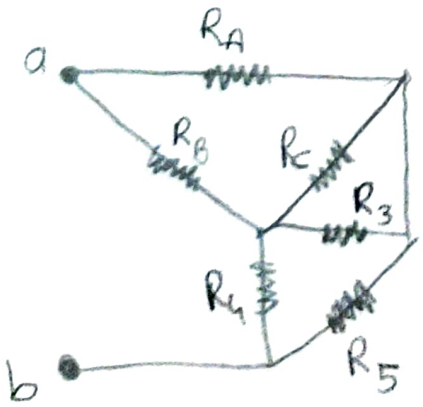
c)



$$* R_A = \frac{50.25}{125} = 10\,\Omega$$

$$* R_B = \frac{25.50}{125} = 10\,\Omega$$

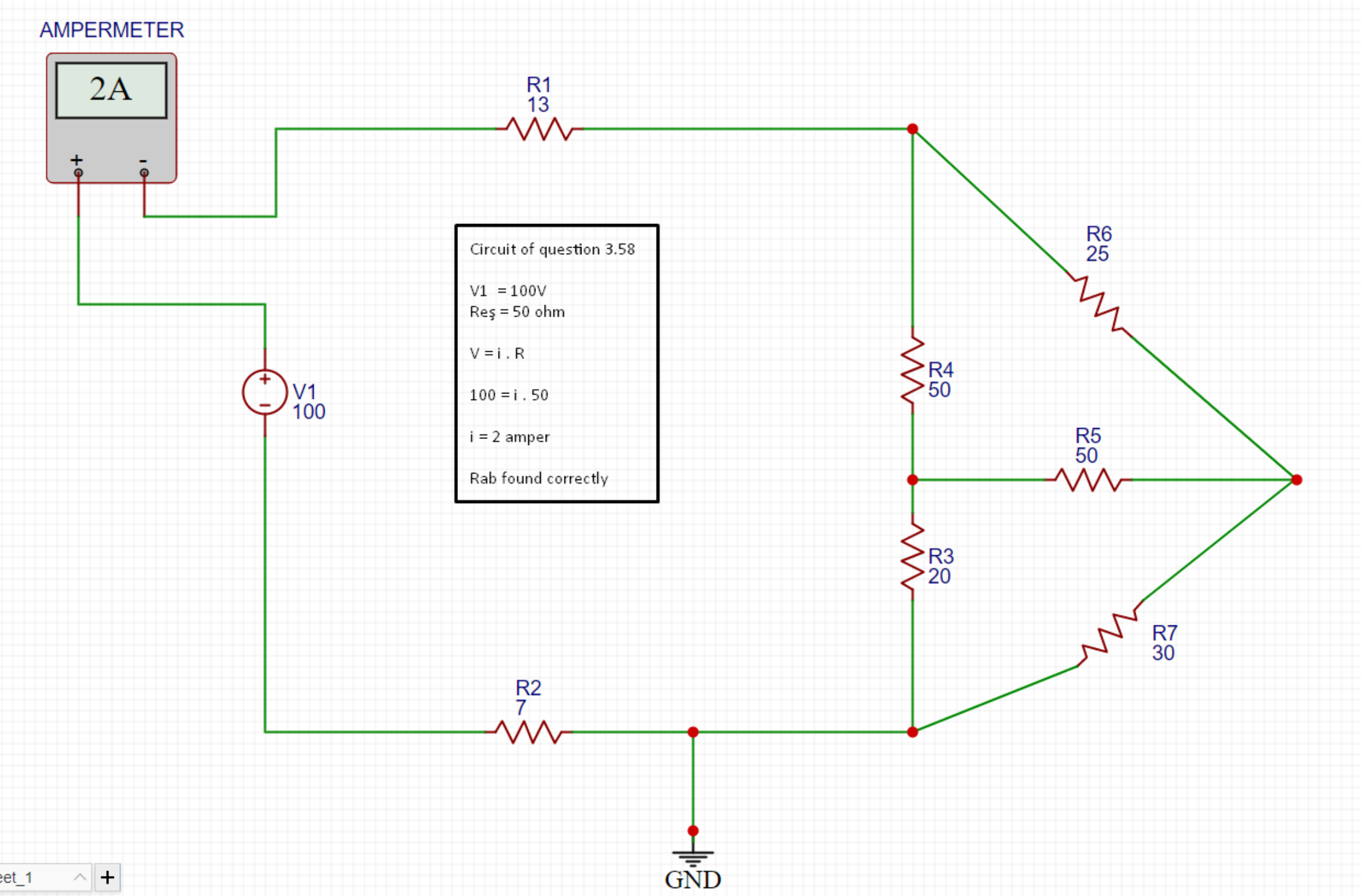
$$* R_C = \frac{50.50}{125} = 20\,\Omega$$



$$* R_A = \frac{13.50 + 13.25 + 25.50}{50} = 44{,}5\,\Omega$$

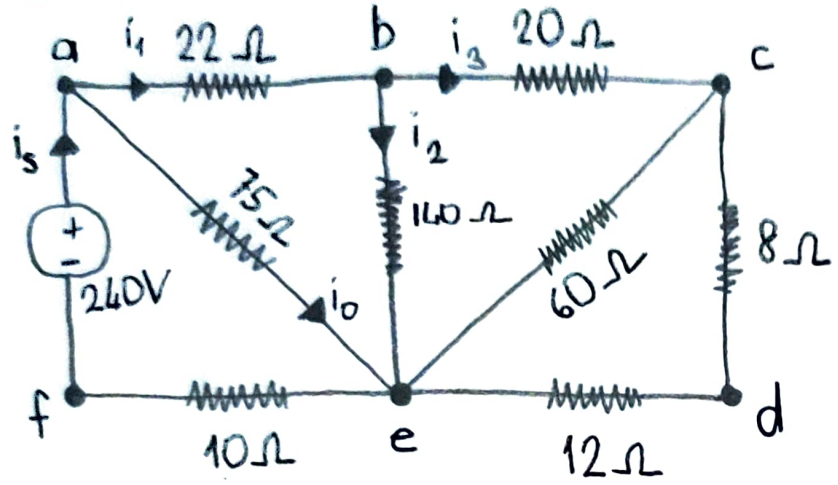
$$* R_B = \frac{13.50 + 13.25 + 25.30}{25} = 69\,\Omega$$

$$* R_C = \frac{13.50 + 13.25 + 25.30}{13} = 132{,}7\,\Omega$$


AMPERMETER
2A
+
-
R1
13
V1
100
Circuit of question 3.58
V1 = 100V
Reş = 50 ohm
V = i . R
100 = i . 50
i = 2 amper
Rab found correctly
R6
25
R4
50
R5
50
R3
20
R7
30
R2
7
GND

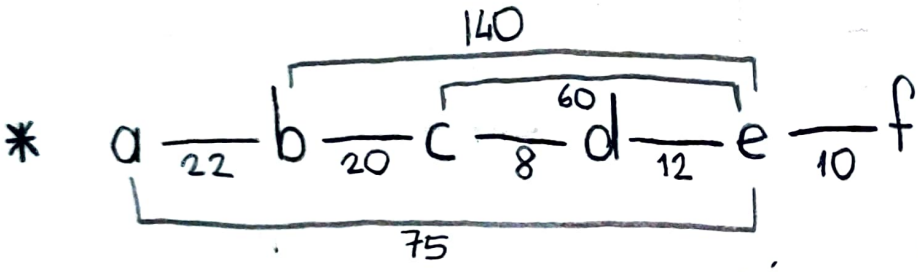
GEEKDAY

• 3.62



$i_o = 2,4A$

$P_{be} = -72,6W$



* $R_. = 8+2 = 20$

$R_{ce} = \frac{20.60}{80} = 15\Omega //$

* $R = 20+15 = 35\Omega$

$R_{be} = \frac{35.140}{175} = 28\Omega //$

* $R = 28+22 = 50\Omega$

$R_{oe} = \frac{50.75}{125} = 30\Omega //$

* $R_{eş} = 30+10 = 40\Omega //$

* $i_s = \frac{240}{40} = 6A //$

* $i_s = i_1 + i_o$

* $i_1 = i_2 + i_3$

* $i_o = \frac{R_1}{R_0+R_1} \cdot i_s = \frac{50}{125} \cdot 6 = 2,4A$

* $R_0 = 75\Omega$

$R_1 = 50\Omega$

* $i_2 = \frac{R_3}{R_2+R_3} \cdot i_1 = \frac{35}{175} \cdot \frac{36}{10} = 0,7A$

* $R_2 = 140\Omega$

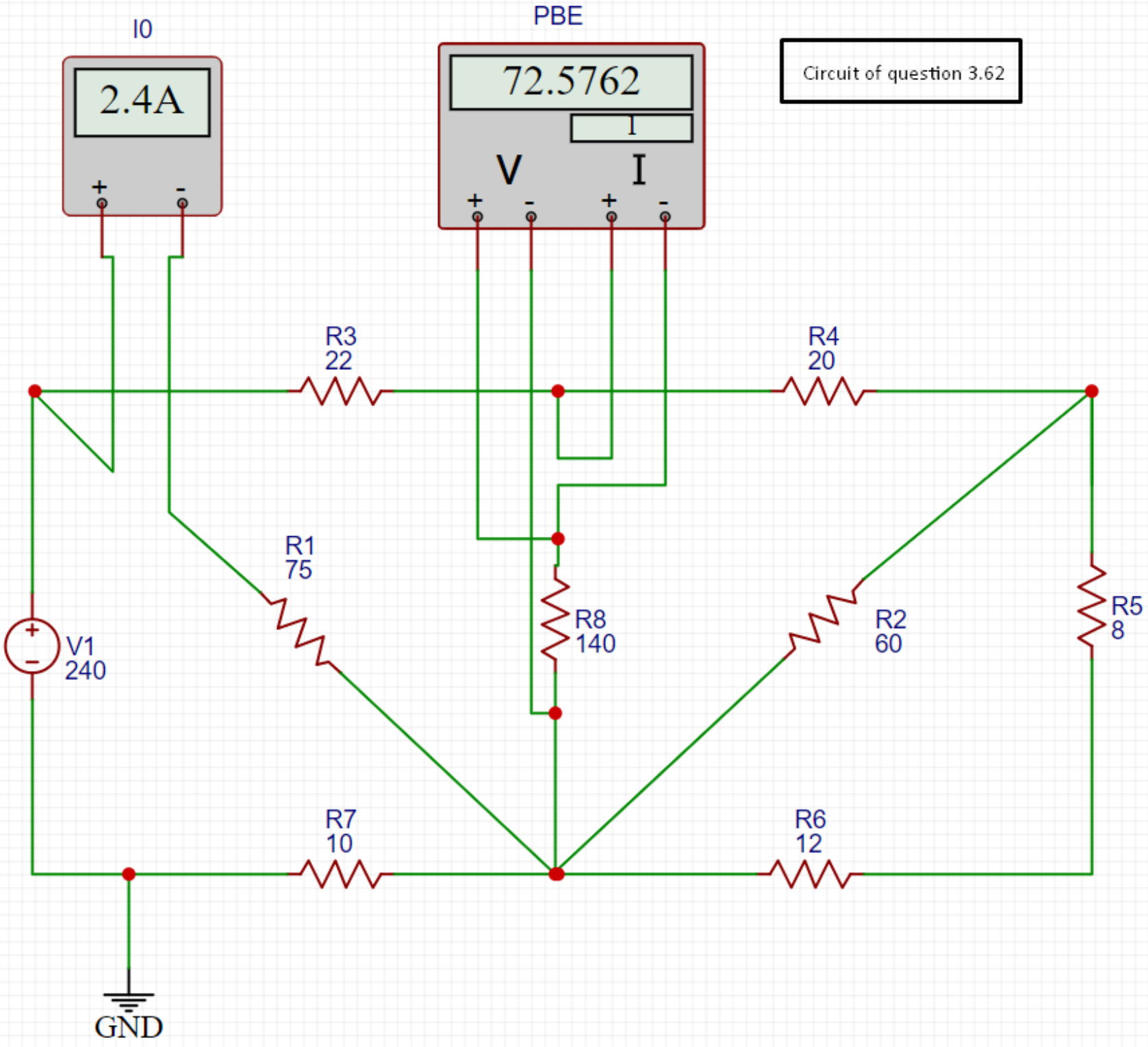
$R_3 = 35\Omega$

$i_1 = I_s - i_o = 6 - (2,4) = 3,6A$

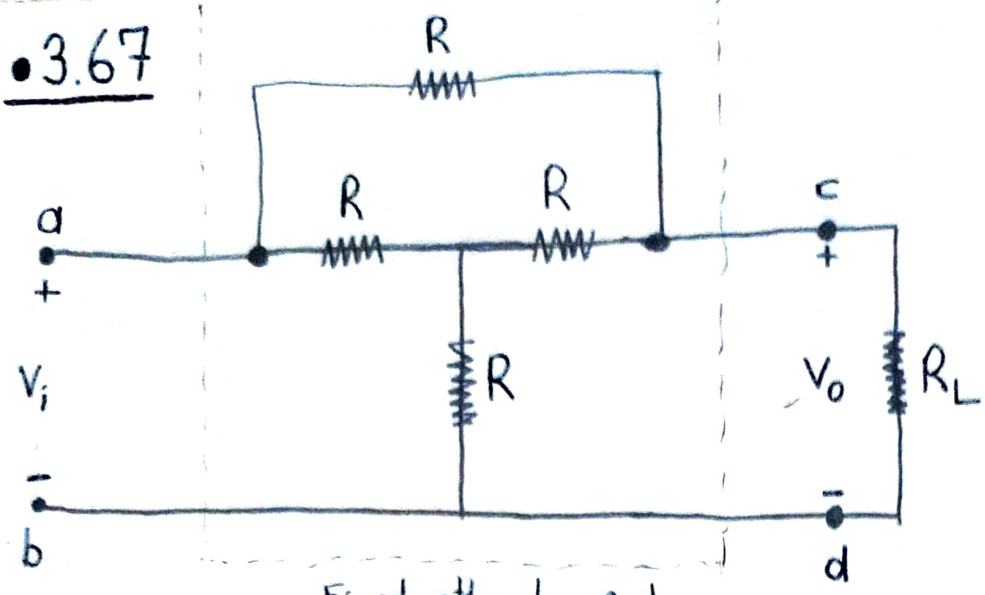
* $p = -V.i = -R.i^2$

$= -140.(0,72)^2$

$= -72,6W$

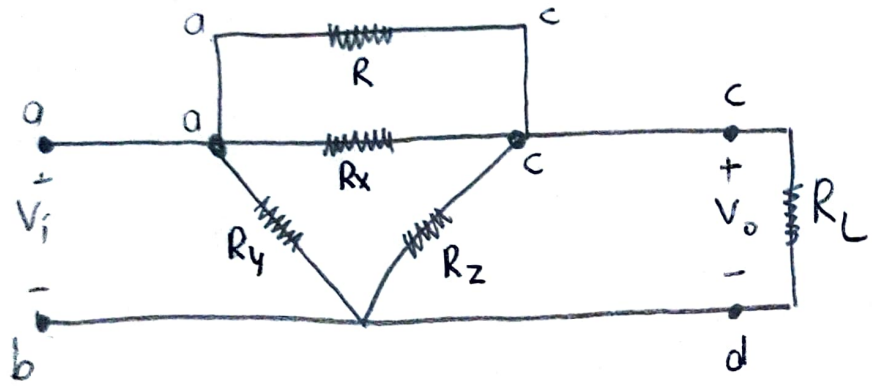

I0
2.4A
+
-
PBE
72.5762
I
V
I
+
-
+
-
Circuit of question 3.62
R3
22
R4
20
R1
75
R8
140
R2
60
R5
8
V1
240
R7
10
R6
12
GND

•3.67



Fixed-attenuator pad

a)



$$*R_x = \frac{(R.R)+(R.R)+(R.R)}{R} = 3R$$

$$*R_y = \frac{3R^2}{R} = 3R$$

$$*R_z = \frac{3R^2}{R} = 3R$$

$\therefore R_L = R$

$*$ a — (R ‖ 3R) — c — (R_L ‖ 3R) — b

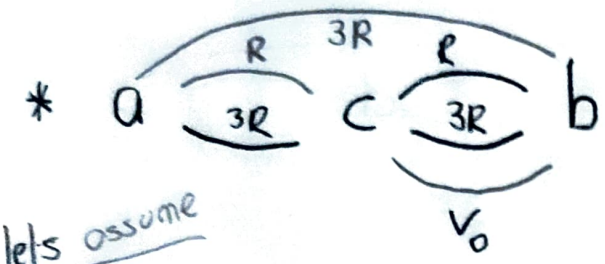
$$* \quad \frac{R.3R}{4R} + \frac{R.3R}{4R}$$

$$* \quad \frac{6R^2}{4R} = \frac{3R}{2}$$

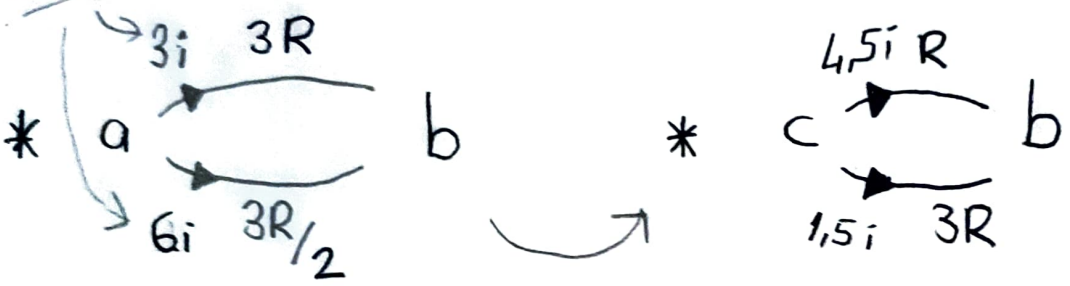
$$* \quad \frac{\frac{3R}{2}.3R}{\frac{3R}{2}+3R} = \frac{\frac{9R^2}{2}}{\frac{9R}{2}} = R = R_{AB}$$

b) $V_i = i \cdot R_{ab}$

$V_0 = i \cdot R_{cb}$



lets assume



* $V_i = 3i \cdot 3R = 9 \cdot i \cdot R$

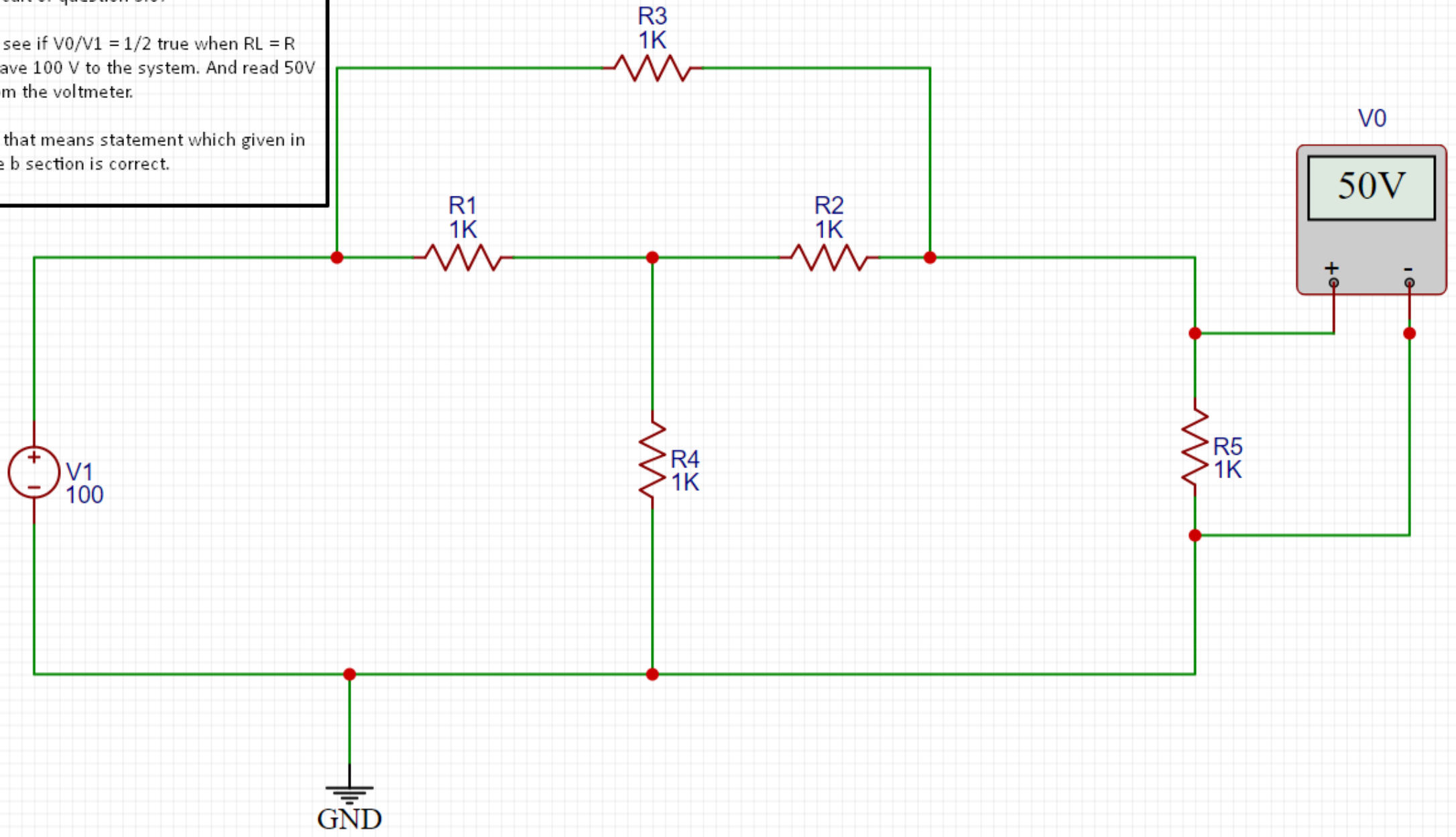
* $V_0 = 1,5i \cdot 3R = 4,5 \cdot i \cdot R$

* $\frac{V_0}{V_i} = \frac{4,5 \cdot i \cdot R}{9 \cdot i \cdot R} = \frac{1}{2}$ //

Circuit of question 3.67

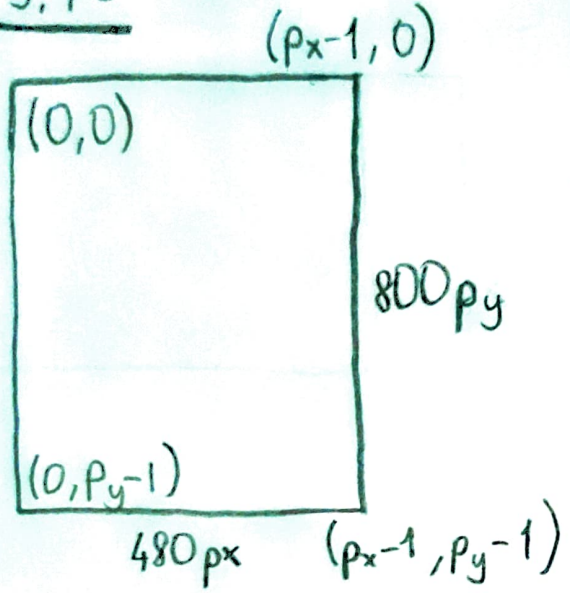
To see if V0/V1 = 1/2 true when RL = R
i gave 100 V to the system. And read 50V
from the voltmeter.

So that means statement which given in
the b section is correct.



GEEKDAY

• 3.73



a) $a = \frac{V_x}{V_s}$, $\beta = \frac{V_y}{V_s}$

* $V_s = 5V$
$V_x = 1V$
$V_y = 3,75V$

* $a = \frac{1V}{5V} = \frac{1}{5}$

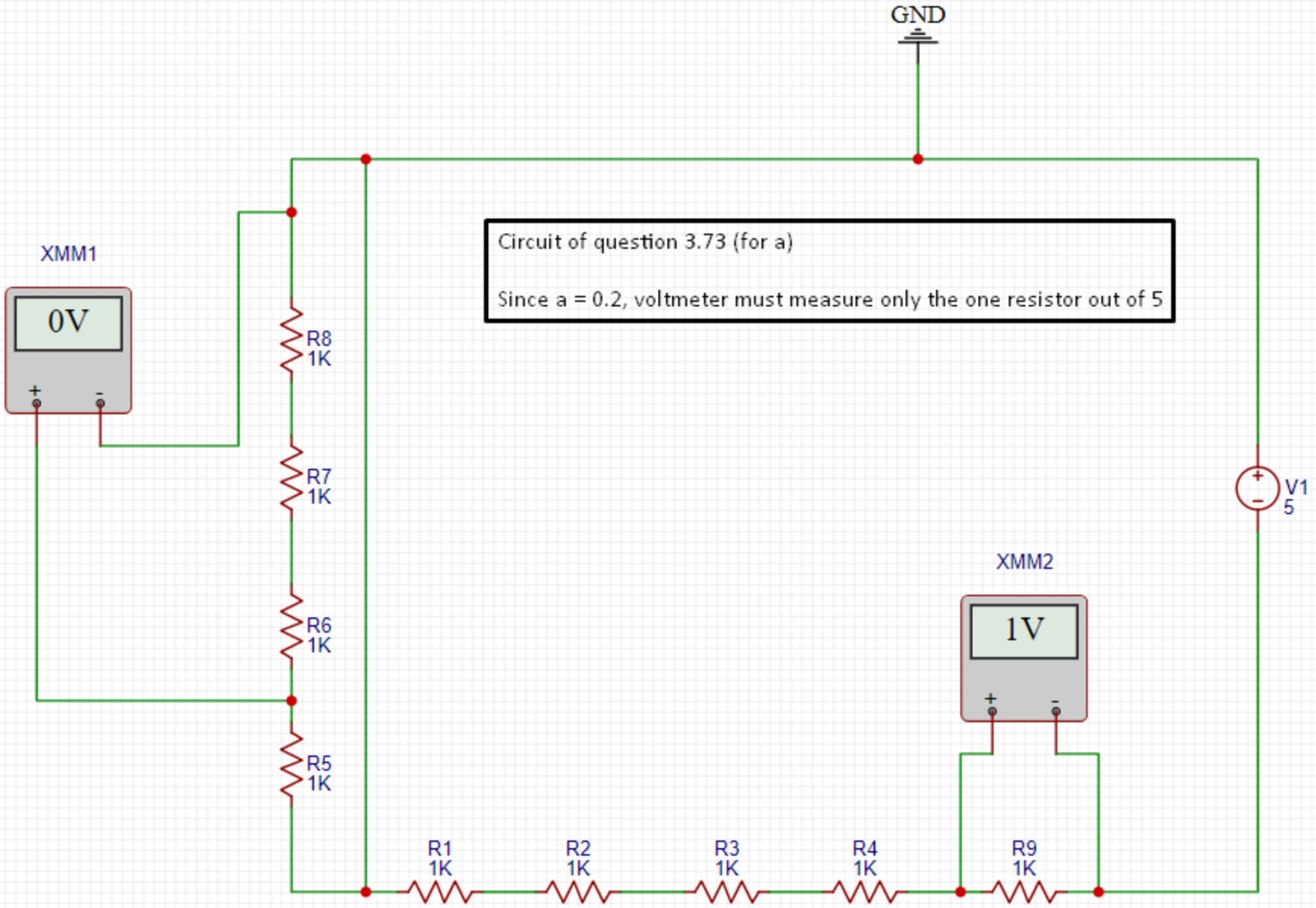
$\beta = \frac{3,75V}{5V} = 0,75$

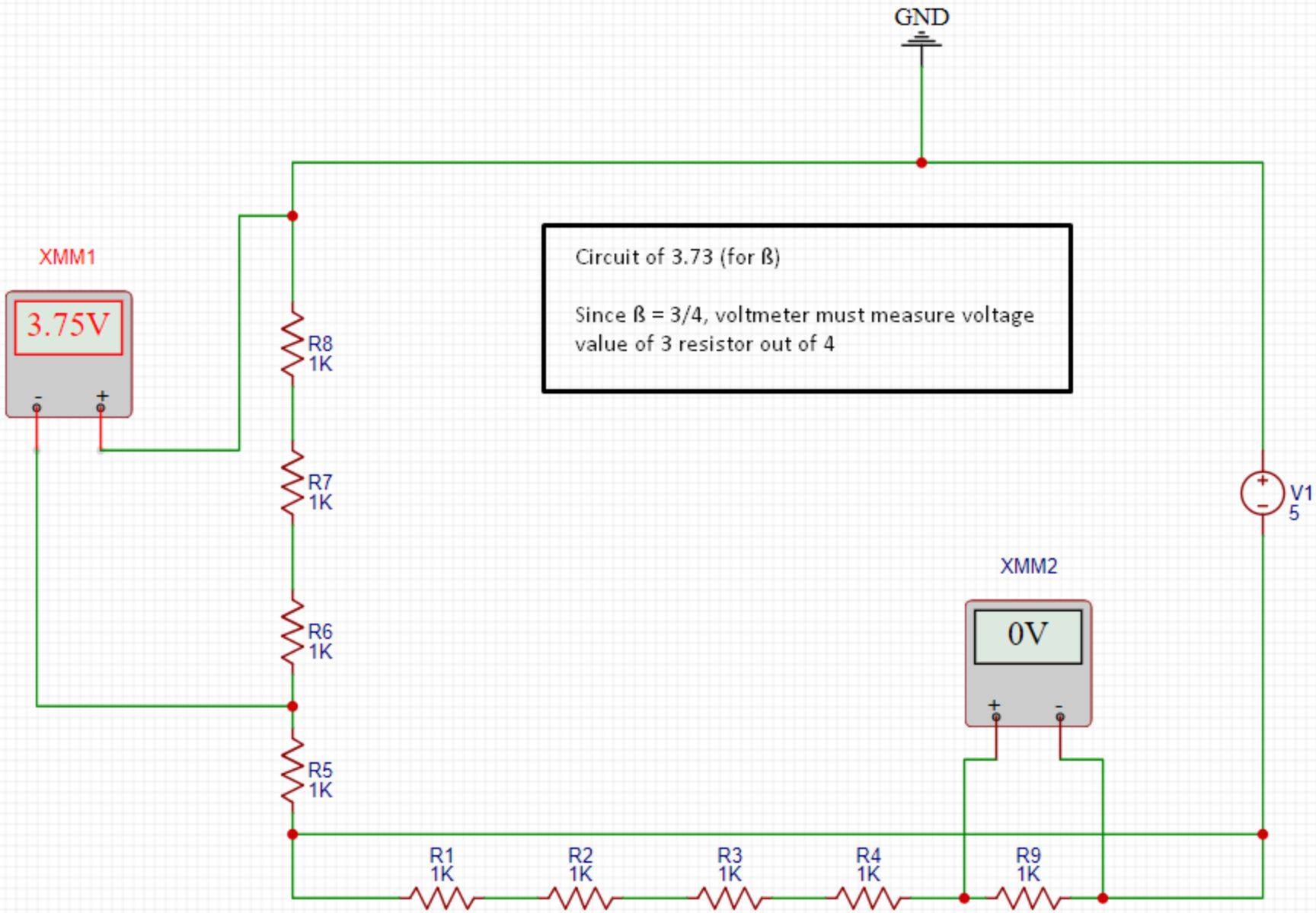
b) $x = (1-a)\,p_x$

$y = (1-\beta)\,p_y$

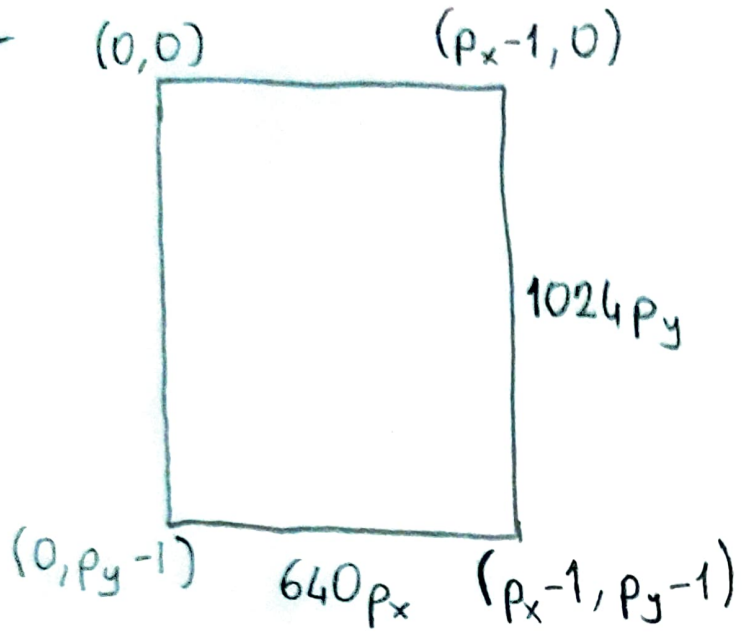
* $x = (1 - 0,2) \cdot 480 = \frac{8}{10} \cdot 480 = 384$ //

* $y = (1 - 0,75) \cdot 800 = \frac{1}{4} \cdot 800 = 200$ //


GND
Circuit of question 3.73 (for a)
Since a = 0.2, voltmeter must measure only the one resistor out of 5
XMM1
0V
+
-
R8
1K
R7
1K
R6
1K
R5
1K
R1
1K
R2
1K
R3
1K
R4
1K
R9
1K
XMM2
1V
+
-
V1
5


GND
XMM1
3.75V
-
+
R8
1K
R7
1K
R6
1K
R5
1K
Circuit of 3.73 (for ß)
Since ß = 3/4, voltmeter must measure voltage value of 3 resistor out of 4
V1
5
XMM2
0V
+
-
R1
1K
R2
1K
R3
1K
R4
1K
R9
1K

• 3.74



* $V_s = 8V$
* $x = 480$
* $y = 192$
* $P_x = 640$
* $P_y = 1024$

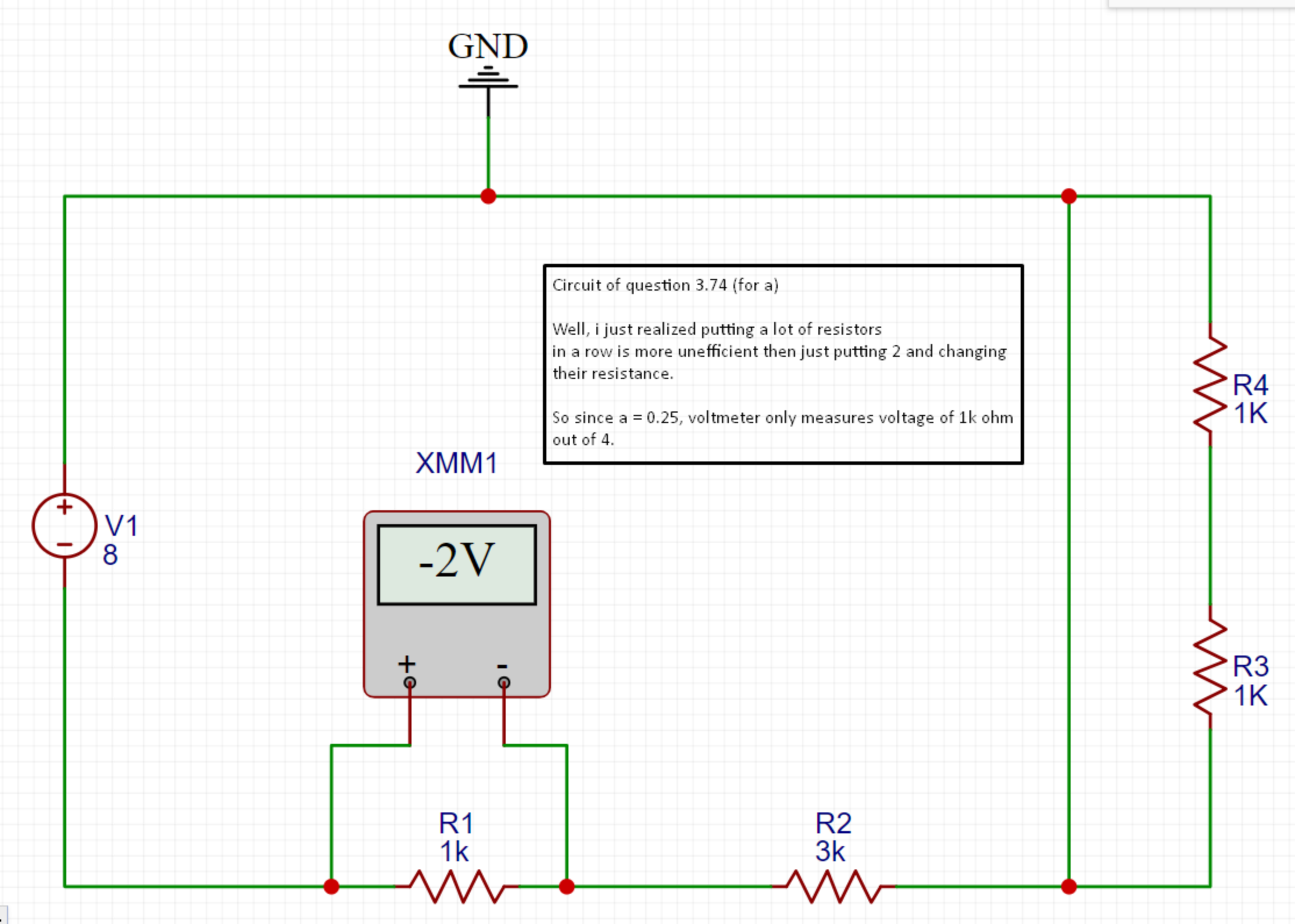
known values

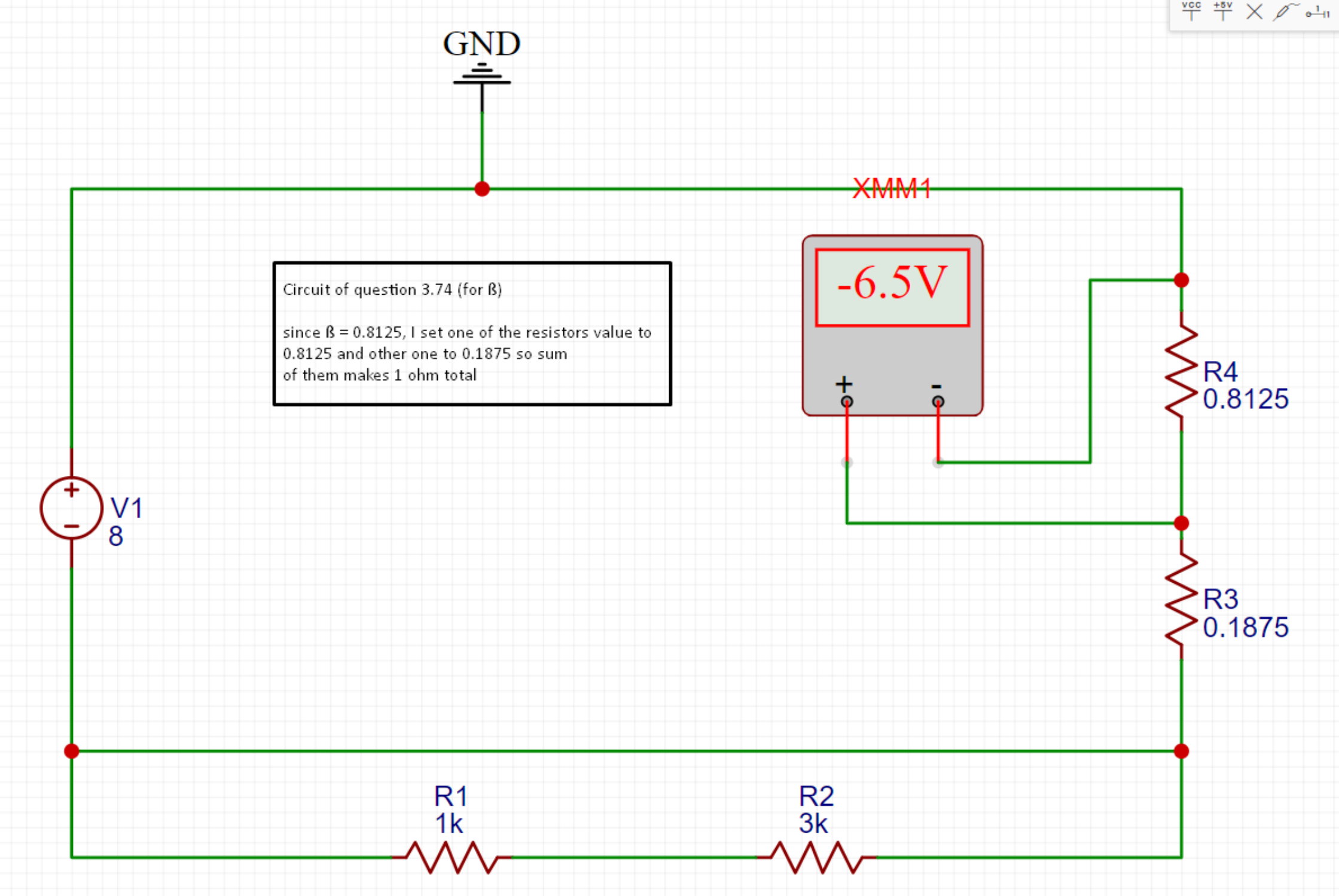
* $x = (1-a) . P_x$
* $480 = (1-a) . 640$
* $(1-a) = 0,75$
* $a = 0,25$

* $a = \frac{V_x}{V_s}$
* $\frac{1}{4} = \frac{V_x}{8}$
* $V_x = 2V$

* $y = (1-\beta) . P_y$
* $192 = (1-\beta) . 1024$
* $(1-\beta) = 0,1875$
* $\beta = 0,8125$

* $\beta = \frac{V_y}{V_s}$
* $\frac{8125}{10000} = \frac{V_y}{8}$
* $V_y = 6,5V$


GND
Circuit of question 3.74 (for a)
Well, i just realized putting a lot of resistors
in a row is more unefficient then just putting 2 and changing
their resistance.
So since a = 0.25, voltmeter only measures voltage of 1k ohm
out of 4.
XMM1
-2V
+
-
V1
8
R1
1k
R2
3k
R3
1K
R4
1K


GND
XMM1
-6.5V
+
-
Circuit of question 3.74 (for ß)
since ß = 0.8125, I set one of the resistors value to 0.8125 and other one to 0.1875 so sum of them makes 1 ohm total
R4
0.8125
R3
0.1875
V1
8
R1
1k
R2
3k