24.10.2022 Clase 7

$Ai = B$

$i = A \backslash B$

$500 i_1 - 833.3 i_2 - 250 i_3 + 250 i_4 = 0 \quad \ldots (1)$

$-1500 i_1 + 500 i_2 + 250 i_3 - 750 i_4 = 0 \quad \ldots (2)$

$i_2 - i_3 = 45\,mA \quad \ldots (3)$

$i_1 - i_4 = 39\,mA \quad \ldots (4)$

$A =$

$10^3 \times$

0.5000	-0.8333	-0.2500	0.2500
-1.5000	0.5000	0.2500	-0.7500
0	0.0010	-0.0010	0
0.0010	0	0	-0.0010

$B =$

0
0
0.0450
0.0390

$A \quad i \quad B$

$10^3 \times$

0.5000	-0.8333	-0.2500	0.2500	i_1	0
-1.5000	0.5000	0.2500	-0.7500	i_2	0
0	0.0010	-0.0010	0	i_3	0.0450
0.0010	0	0	-0.0010	i_4	0.0390

24.10.2022

```
syms i1 i2 i3 i4
format shortEng
A=[500 -833.3 -250 250
    -1500 500 250 -750
    0 1 -1 0
    1 0 0 -1]
B=[0
    0
    45e-3
    39e-3]
i=[i1
    i2
    i3
    i4]
i=A\B
```

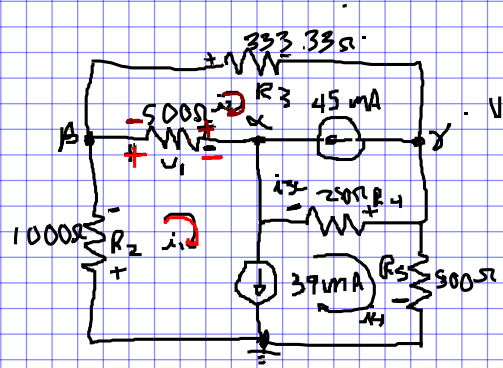
i = 4×1

$i_1 =$ 11.0001e-003

$i_2 =$ 9.0004e-003

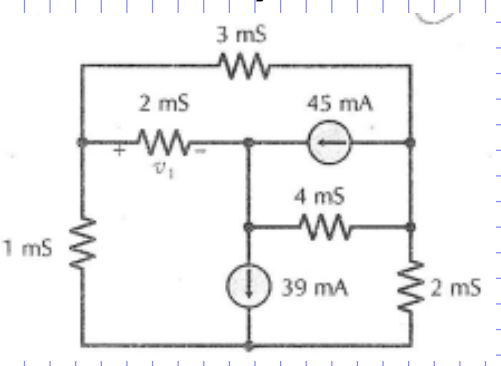
$i_3 =$ -35.9996e-003

$i_4 =$ -27.9999e-003



$V_1 = R_1(i_1 - i_2) = 500\Omega\,(11\,mA - 9\,mA)$

$= 500\Omega\,(0.002) = 1V$



Sección 4-4 Análisis de circuitos con fuentes de voltaje y corriente independientes, mediante voltaje de nodos

P 4.4-7 Calcule v_a en el circuito de la figura P 4.4-7.
Respuesta: $v_a = 19.37$ V

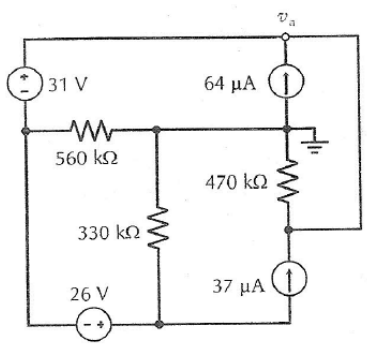
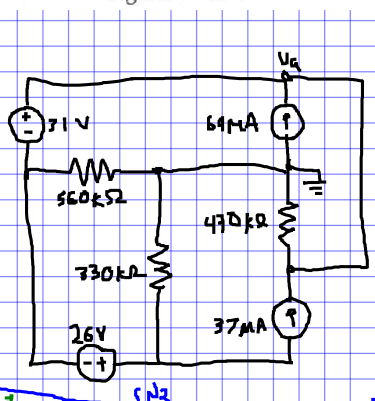


Figura P 4.4-7

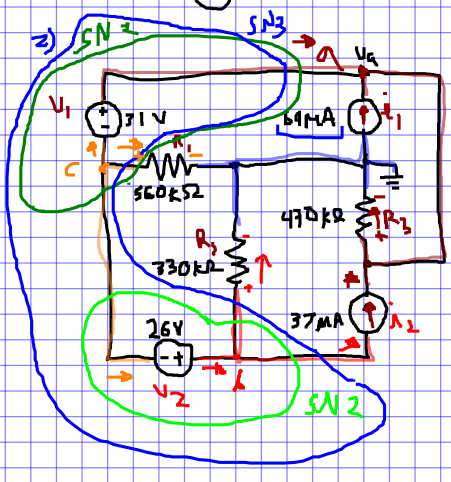
Sol:

a)



1) $V_a = ?$

2) SN 1 SN 3



3) ✓

4) KCL SN3

$-i_1 - i_{R3} + i_2 \quad -i_{R2} - i_2 \quad -i_{R1} = 0$

a b c

$i_1 - i_{R3} - i_{R2} - i_{R1} = 0$

$-\frac{V_a}{R_3} - \frac{V_b}{R_2} - \frac{V_c}{R_1} = -64\,\mu A$

$-\frac{V_a}{470k\Omega} - \frac{V_b}{330k\Omega} - \frac{V_c}{560k\Omega} = -64\,\mu A$

m.c.m.

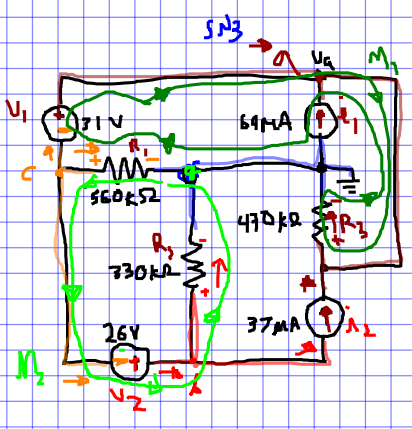
470	330	560	2
235	165	280	1
		140	2
		70	2
235	165	35	5
47	33	7	3
47	11	7	7
47	11	1	11
47	1		47
1			

2 · 2 · 2 · 5 · 3 · 7 · 11 · 47 = 968,560

$-\frac{V_a}{470k\Omega} - \frac{V_b}{330k\Omega} - \frac{V_c}{560k\Omega} = -64\,\mu A$

$\frac{968,560}{470,000}V_a - \frac{968,560}{330000}V_b - \frac{968,560}{560000}V_c = (0.000064)(968,560)$

$1.84\,V_a - 2.63\,V_b - 1.55\,V_c = -55.58\,V \quad \ldots (1)$



KVL M_1

$V_{R1} + V_1 - V_{R3} = 0$

$V_c + V_1 - V_a = 0$

$V_1 = V_a - V_c$

$V_a - V_c = 31V \quad \ldots (2)$

KVL M_2

$V_{R1} + V_2 - V_{R2} = 0$

$V_c + V_2 - V_b = 0$

$V_2 = V_b - V_c$

$V_b - V_c = 25V \quad \ldots (3)$