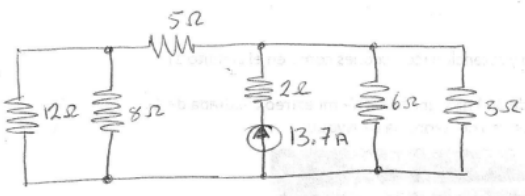
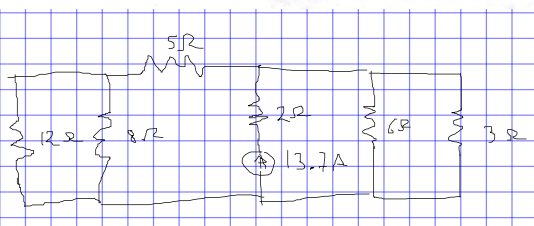
Clase 2 | 13.10.2022

- Para el siguiente circuito encontrar las corrientes en todas las resistencias.



a)



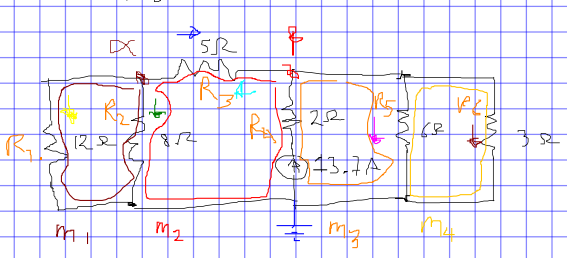
b)

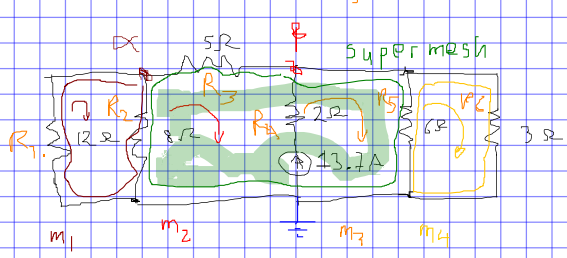
$i_{R_1} =$ $i_{R_4} = 13.7\ A$

$i_{R_2} =$ $i_{R_5} =$

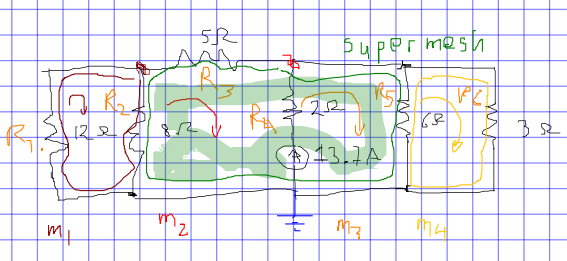
$i_{R_3} =$ $i_{R_6} =$

c)



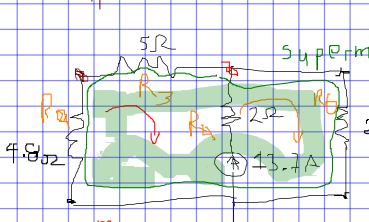


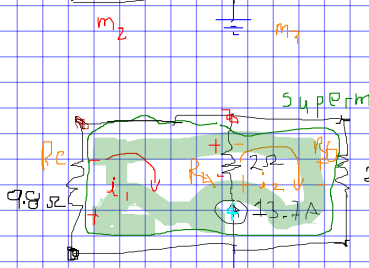
d)



$R_4 = R_1 \parallel R_2 = \frac{R_1 R_2}{R_1 + R_2} = \frac{(12)(8)}{12+8} = 4.8\ \Omega$

$R_6 = R_3 \parallel R_6 = \frac{R_3 R_6}{R_3 + R_6} = \frac{(6)(3)}{6+3} = 2\ \Omega$





e)

Applying KVL at supermesh:

$-v_{R_C} - v_{R_6} = 0$

$-R_4 i_1 - R_6 i_2 = 0$

$-4.8 i_1 - 2 i_2 = 0 \quad \cdots (1)$

Applying KCL at GND:

$i_2 - i_1 - 13.7\ A = 0$

$i_2 - i_1 = 13.7\ A \quad \cdots (2)$

(2) + (1)

$-4.8 i_1 - 2 i_2 = 0$

$-2 i_1 + 2 i_2 = 27.4\ A$

$-11.8 i_1 = 27.4\ A$

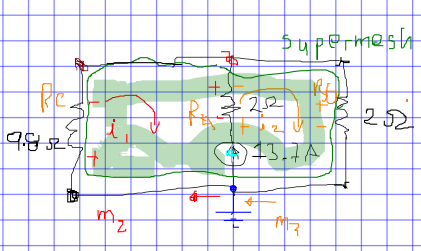
$i_1 = \frac{27.4\ A}{11.8}$

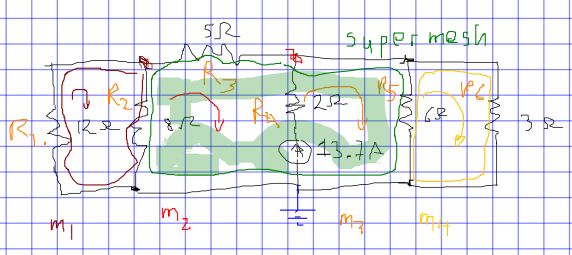
$i_1 = -2.32\ A$

$i_2 = 13.7\ A + i_1$

$= 13.7\ A - 2.32$

$i_2 = 11.38\ A$





Applying a Current Divisor:

$i_x = \frac{R_T}{R_x} i_T$

$i_{R_1} = \frac{R_4}{R_1} i_1$

$= \frac{4.8\ \Omega}{12\ \Omega}(2.32\ A)$

$= 0.928\ A$

$i_{R_6} = \frac{R_6}{R_6} i_2$

$= \frac{2\ \Omega}{3\ \Omega}(11.32\ A)$

$i_{R_6} = 7.58\ A$

$i_{R_1} = 0.928\ A$

$i_{R_2} = i_1 - i_{R_1} = 2.32 - 0.928\ A = 1.4\ A$

$i_{R_3} = i_1 = -2.32\ A$

$i_{R_4} = 13.7\ A$

$i_{R_5} = i_2 - i_{R_6} = (11.32 - 7.58)\ A = 3.74\ A$

$i_{R_6} = 7.58\ A$

Applying Ohm's Law:

$i_{R_1} = \frac{V_A}{R_1} = \frac{11.14\ V}{12\ \Omega} = 0.92\ A$

$i_{R_2} = \frac{V_A}{R_2} = \frac{11.14\ V}{8} = 1.39\ A$

$i_{R_3} = \frac{V_A - V_B}{R_3} = \frac{11.14\ V - 22.75\ V}{5} = -2.32\ A$

$i_{R_4} = 13.7\ A$

$i_{R_5} = \frac{V_B}{R_5} = \frac{22.75\ V}{6} = 3.79\ A$

$i_{R_6} = \frac{V_B}{R_6} = \frac{22.75\ V}{3} = 7.58\ A$

f)

Comp.