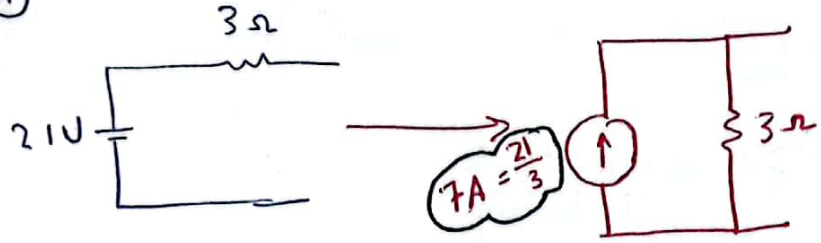
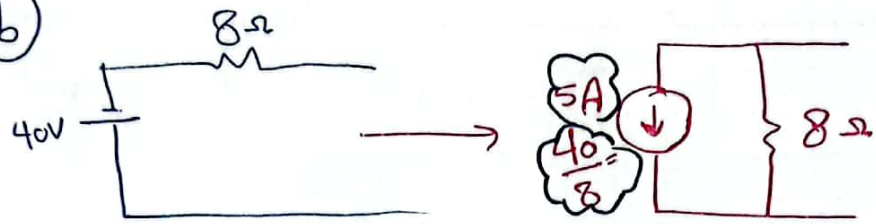
Sheet ③

① Transform Voltage Source

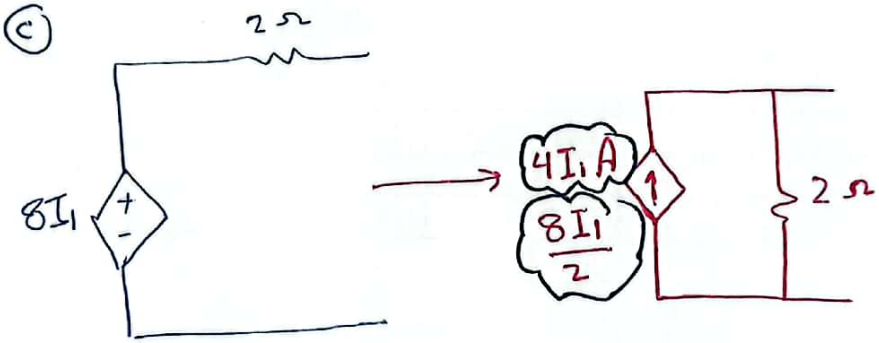
(a)



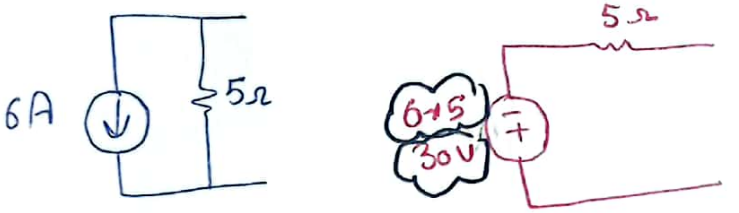
(b)

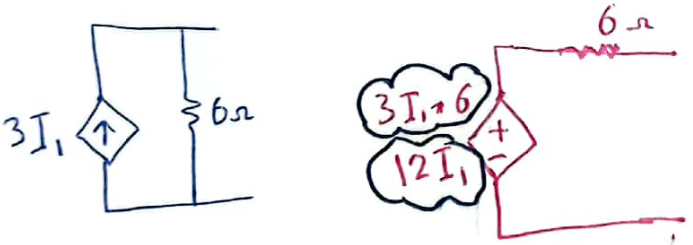


(c)

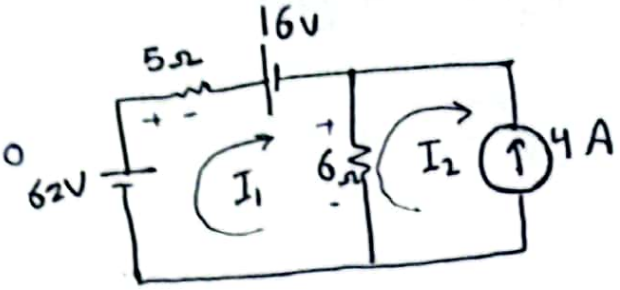


[2] Transform current source





③ Find mesh Current



KVL at mesh ①

$$62 - 5I_1 - 16 - 6(I_1 - I_2) = 0$$

$$46 - 11I_1 + 6I_2 = 0$$

$$11I_1 - 6I_2 = 46 \longrightarrow ①$$

at loop (mesh ②) From The source

mesh Current $I_2 = -4A$ → ②

From ② in ①

$$11I_1 - (6 * -4) = 46$$

$$I_1 = \frac{46 - 24}{11} = 2A \rightarrow \boxed{I_1 = 2A}$$

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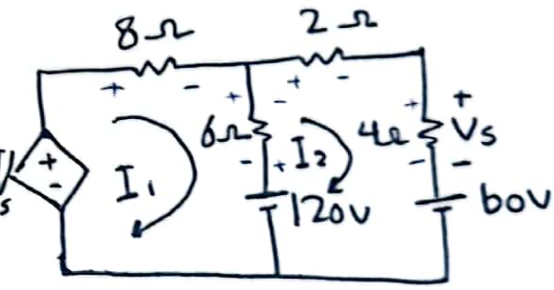
④ mesh Current



KVL at mesh ①

$$-120 + 0.5V_s - 8I_1 - 6(I_1 - I_2) = 0$$

$$V_s = I_2 * 4$$

$$-120 + (0.5 * 4I_2) - 8I_1 - 6I_1 + 6I_2 = 0$$ ($4I_2 = 2I_2$)

$$-14I_1 + 8I_2 = 120 \longrightarrow ①$$

KVL at mesh ②

$$120 - 6(I_2 - I_1) - 2I_2 - 4I_2 - 60 = 0$$

$$60 + 6I_1 - 12I_2 = 0 \longrightarrow$$

$$6I_1 - 12I_2 = -60 \longrightarrow ②$$

Solve ①, ②

$$I_1 = -8A$$

$$I_2 = 1A$$

⑤ find node voltages

by apply kcl at node ①

$57 = I_1 + I_2 + 15$

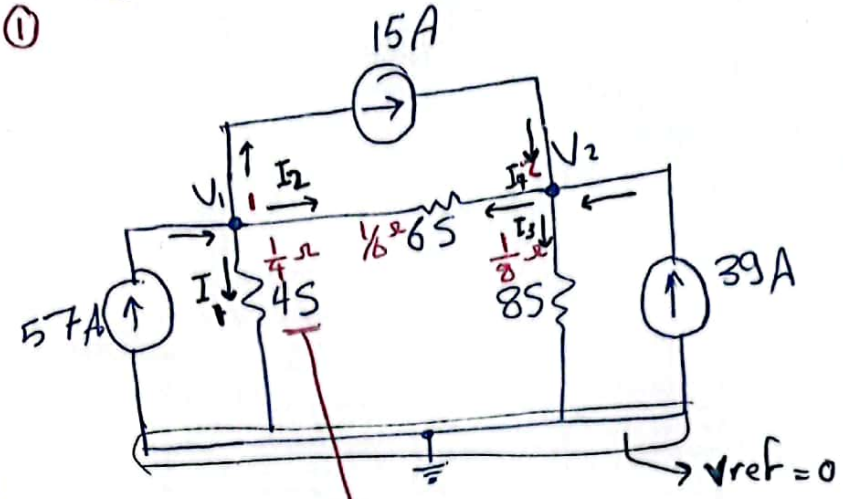
$57 - 15 = I_1 + I_2$

$I_1 + I_2 = 42$

$$\frac{U_1 - 0}{1/4} + \frac{U_1 - U_2}{1/6} = 42$$

$4U_1 + 6U_1 - 6U_2 = 42$

$10U_1 - 6U_2 = 42 \longrightarrow ①$



$R = \frac{1}{G}\ \Omega$

by apply kcl at ②

$15 + 39 = I_4 + I_3$

$54 = I_4 + I_3$

$$\frac{U_2 - U_1}{1/6} + \frac{U_2}{1/8} = 54$$

$6U_2 - 6U_1 + 8U_2 = 54$

$-6U_1 + 14U_2 = 54 \longrightarrow ②$

by solve ① ② :

$U_1 = 8.769$ Volt

$U_2 = 7.615$ Volt