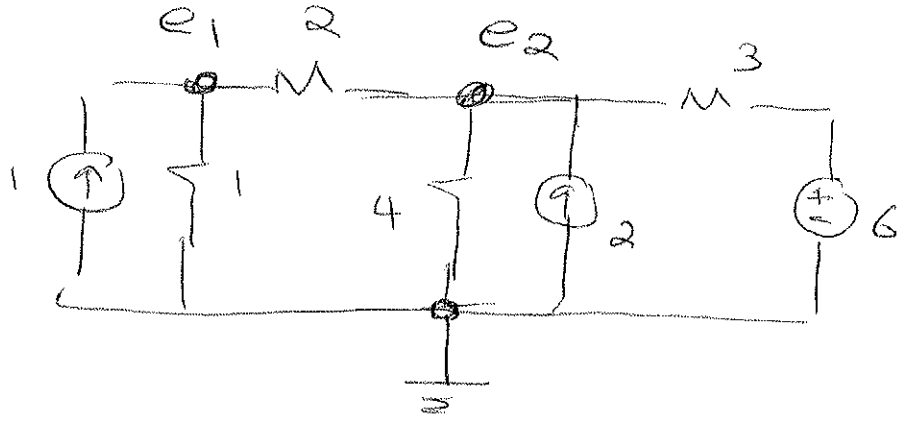


$$i_3 = 0$$

$$\begin{cases} \frac{v_1}{2} = \frac{v_2}{1} \\ 2i_1 = 1i_2 \\ v_2 = -1 \times i_2 \end{cases}$$

$$i = i_1 = \frac{1}{2} \sin t$$

(2)



node

$$-1 + e_1 + \frac{e_1 - e_2}{2} = 0$$

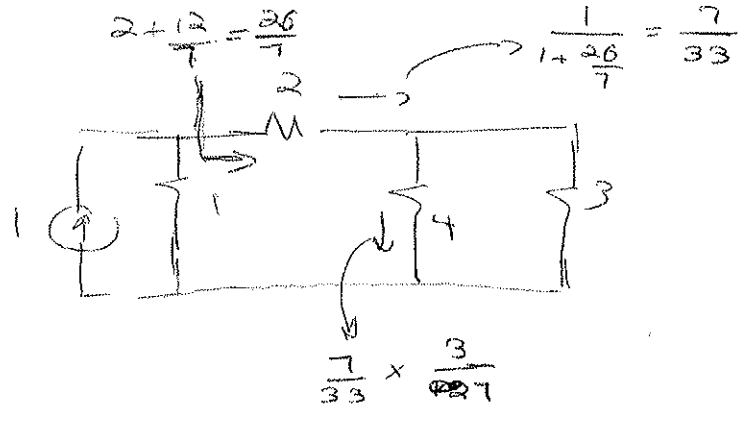
$$\frac{e_2 - e_1}{2} + \frac{e_2}{4} - 2 + \frac{e_2 - 6}{3} = 0$$

$$\begin{cases} \frac{3}{2}e_1 - \frac{e_2}{2} = 1 \\ -\frac{e_1}{2} + \frac{13}{12}e_2 = 4 \end{cases}$$

$$\Rightarrow e_1 = \frac{74}{33} \text{ V}, e_2 = \frac{52}{11} \text{ V} \Rightarrow \left| i = \frac{52/11}{4} = \frac{13}{11} \text{ A} \right|$$

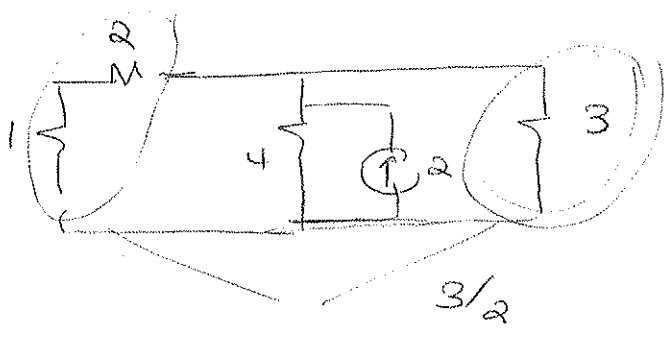
Superposition

$$1A: \frac{7}{33} \times \frac{3}{7} = \frac{1}{11} \text{ A}$$



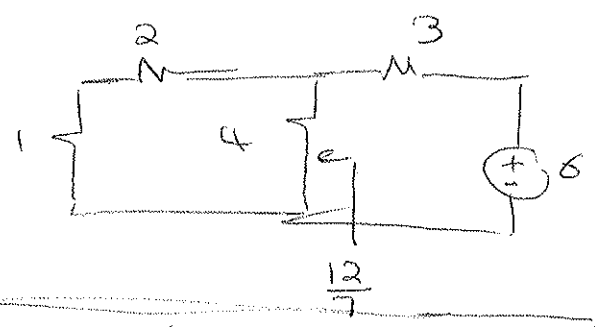
2A:

$$2 \times \frac{\frac{3}{2}}{\frac{3}{2} + 4} = 2 \times \frac{3}{3+8} = \frac{6}{11} \text{ A}$$



6V:

$$6 \times \frac{\frac{12}{7}}{3 + \frac{12}{7}} \times \frac{1}{4} = \frac{6 \times 3}{21 + 12} = \frac{6}{11} \text{ A}$$



$$\left| \text{Total} \right| = \frac{1}{11} + \frac{6}{11} + \frac{6}{11} = \frac{13}{11} \text{ A}$$

3

$$i_{L_1}(0^-) = I_0$$

$$i_{L_2}(0^-) = 0$$

$$\Rightarrow i_{L_1}(0^+) = I_0$$

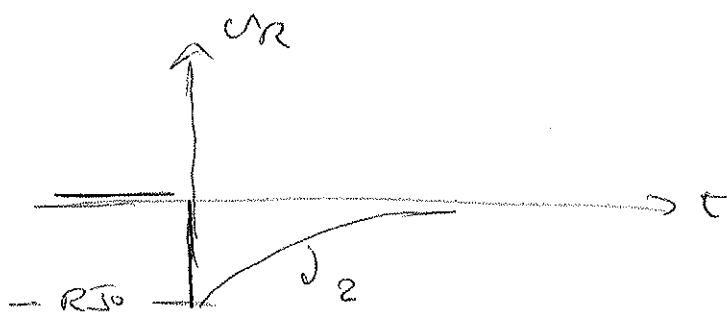
$$i_{L_2}(0^+) = 0$$

$$\Rightarrow v_R(0^+) = -i_{L_1}(0^+) - i_{L_2}(0^+) = -I_0$$

$$v_R(0^+) = -RI_0$$

$$\Rightarrow v_R = -RI_0 e^{-t/\tau}$$

$$\tau = \frac{L_1 || L_2}{R} = \frac{L_1 L_2}{(L_1 + L_2)R}$$



$$i_{L_1} = \frac{1}{L_1} \int_0^t v_R dt + i_{L_1}(0^+) = \frac{1}{L_1} (-RI_0 \tau) (e^{-t/\tau} - 1) + I_0$$
$$= -I_0 \frac{L_2}{L_1 + L_2} (e^{-t/\tau} - 1) + I_0$$

$$i_{L_2} = \frac{1}{L_2} \int_0^t v_R dt + i_{L_2}(0^+) = \frac{1}{L_2} (-RI_0 \tau) (e^{-t/\tau} - 1)$$
$$= -I_0 \frac{L_1}{L_1 + L_2} (e^{-t/\tau} - 1)$$

$$t \rightarrow \infty: i_{L_1}(\infty) = -i_{L_2}(\infty) = \frac{L_1}{L_1 + L_2} I_0$$

clearly: $i_R(\infty) = 0$