

a)  $A = 10V$

$$\frac{B}{1000} + \frac{B-A}{2000} + \frac{B}{2000} + \frac{B-C}{3000} = 0 \Rightarrow 6B + 3B - 3A + 3B + 2B - 2C = 0$$

$$\underline{14B - 2C = 30}$$

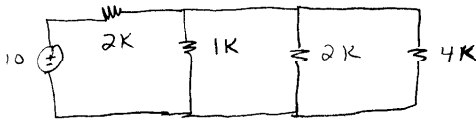
$$\frac{C}{1000} + \frac{C-B}{2000} = 0 \Rightarrow 3C + C - B = 0$$

$$\underline{4C = B}$$

$$\Rightarrow 14(4C) - 2C = 30 \quad C = \frac{30}{54}V, \quad B = 4C$$

$$\boxed{V_X = B = \frac{120}{54}V}$$

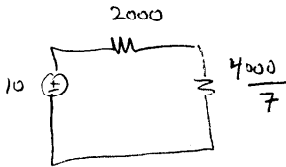
b) Simplify



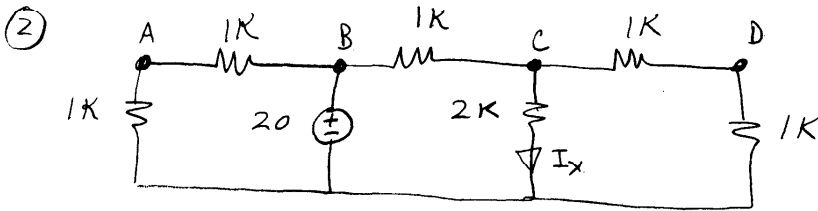
$$\frac{1}{R_{eq}} = \frac{1}{4k} + \frac{1}{2k} + \frac{1}{1k}$$

$$= \frac{1+2+4}{4k} \Rightarrow$$

$$R_{eq} = \frac{4000}{7} \Omega$$



$$V_X = 10 \left( \frac{4000/7}{2000 + 4000/7} \right) = \underline{\underline{\frac{120}{54}V}}$$



a)  $\frac{A-B}{1000} + \frac{A}{1000} = 0 \Rightarrow \underline{A = B/2}$

$\underline{B = 20}$

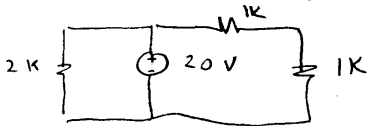
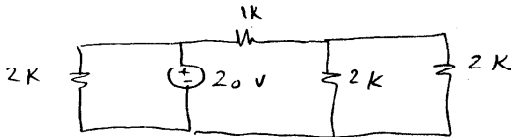
$\frac{C-D}{1000} + \frac{C}{2000} + \frac{C-D}{1000} = 0 \Rightarrow \begin{aligned} 2C - 2B + C + 2C - 2D &= 0 \\ \underline{5C - 2D} &= 40 \end{aligned}$

$\frac{D-C}{1000} + \frac{D}{1000} = 0 \Rightarrow \underline{D = C/2}$

$\Rightarrow 5C - C = 40 \quad \underline{C = 10V}$

$I_x = \frac{10V}{2000} = \underline{5mA}$

b)



$V_{1K} = 20 \left( \frac{1000}{1000+1000} \right) = 10V$

$\therefore$  there are 10V across 2K resistor, and

$I_x = \frac{10V}{2000} = \underline{5mA}$