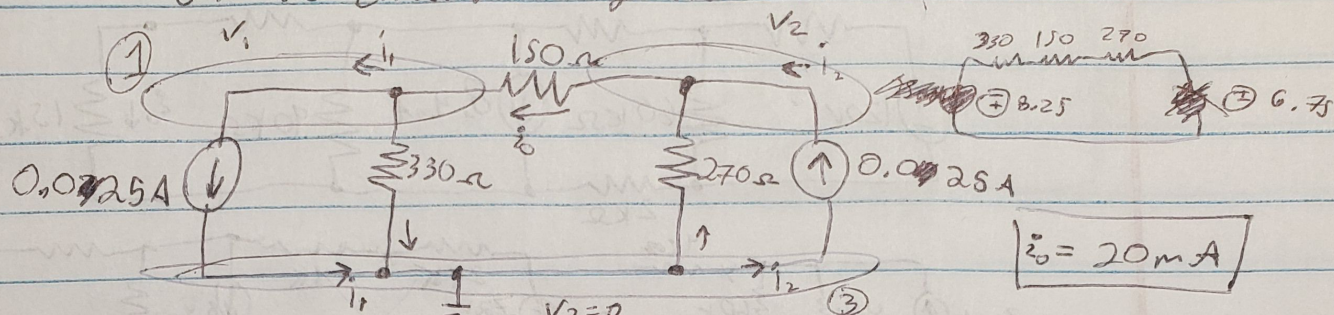
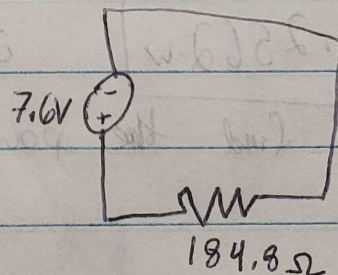
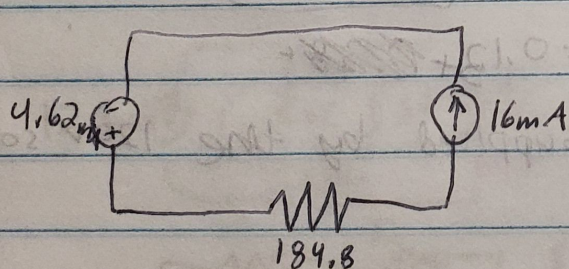
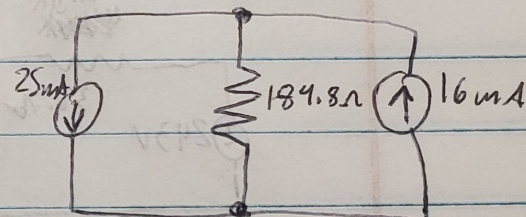
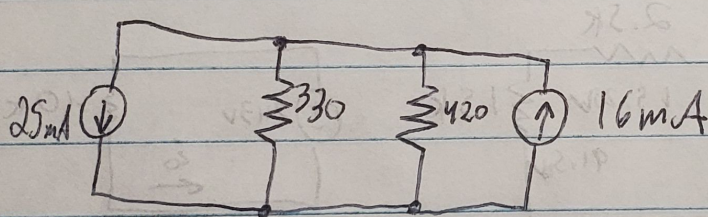
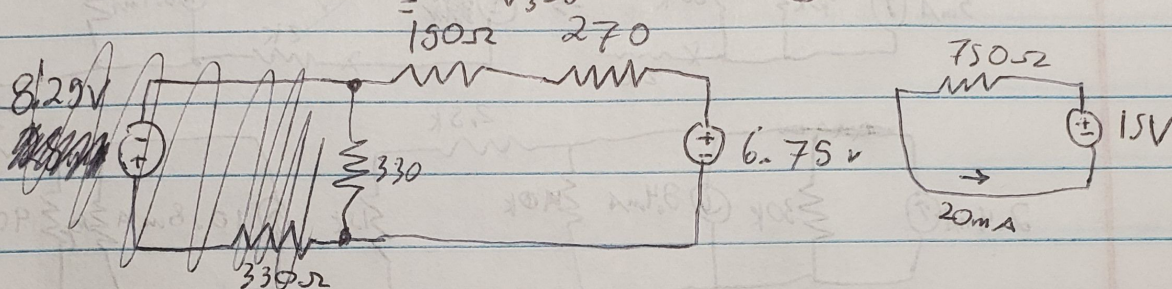


HW 6

4.59 a) use source transformations to find the current i_o in the circuit in Fig. 4.59.



$$i_o = 20 \text{ mA}$$



b) verify your solution by using the node-voltage method to find i_o

$$i_o = \frac{V_2 - V_1}{150}$$

$$\text{KCL at } \textcircled{3}: \frac{V_1}{330} = \frac{V_2}{270}$$

$$\text{KCL at } \textcircled{1}: i_o = \frac{V_1}{330} + 0.025$$

$$0 = \frac{V_2}{150} - \frac{V_1}{150} - i_o$$

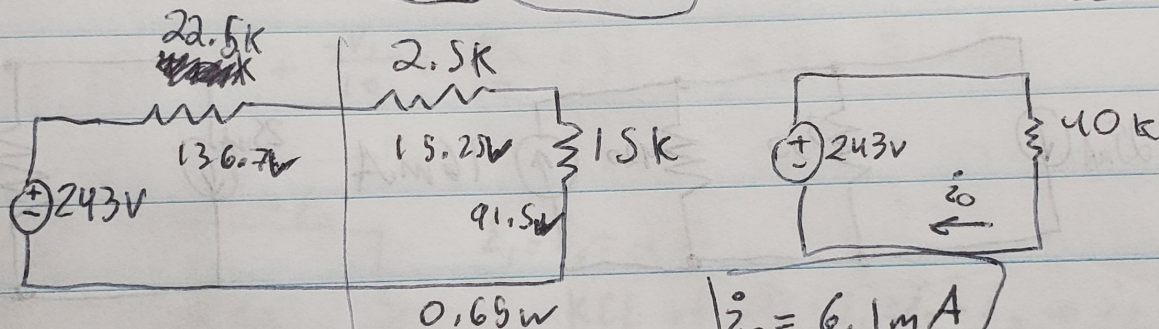
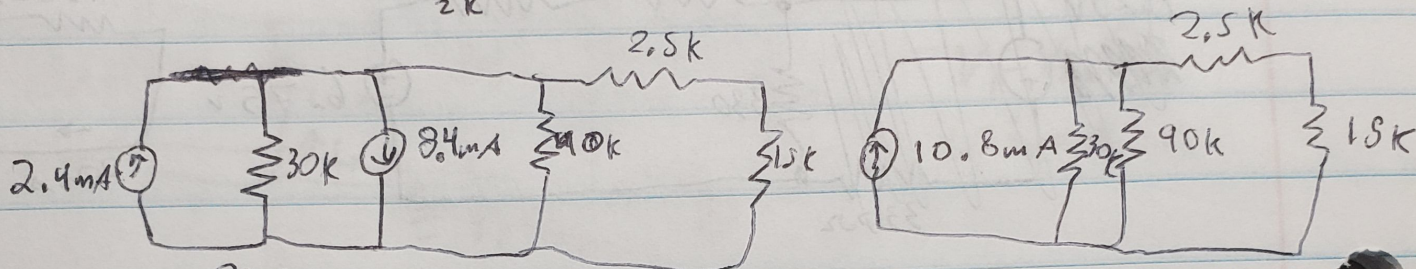
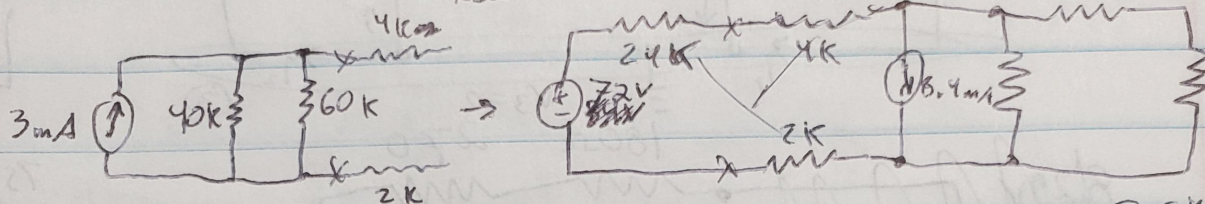
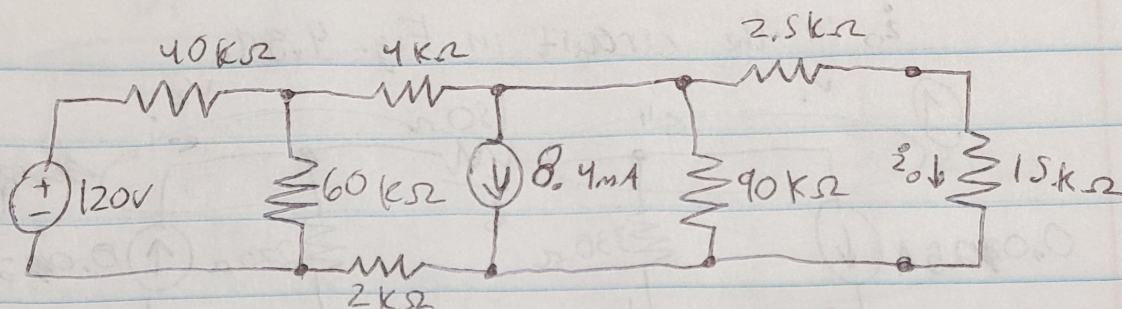
$$\frac{V_1}{330} - \frac{V_2}{270} = 0$$

$$-\frac{V_1}{330} + i_o = 0.025$$

$$\begin{bmatrix} -\frac{1}{150} & \frac{1}{150} & -1 & 0 \\ \frac{1}{330} & -\frac{1}{270} & 0 & 0 \\ -\frac{1}{330} & 0 & 1 & 0.025 \end{bmatrix}$$

$$\begin{aligned} V_1 &= 13.75 & V_1 &= -5.8929 \\ V_2 &= 11.25 & V_2 &= -4.8214 \\ i_o &= -0.0167 & i_o &= 0.0071 \text{ A} \end{aligned}$$

4.60 a) Find i_o by ~~source~~ ^{source} transformations

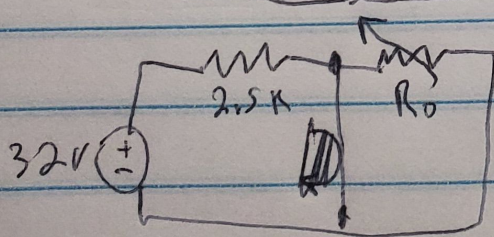
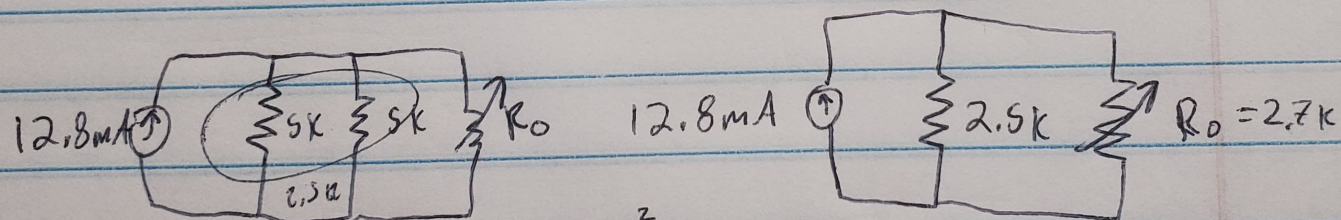
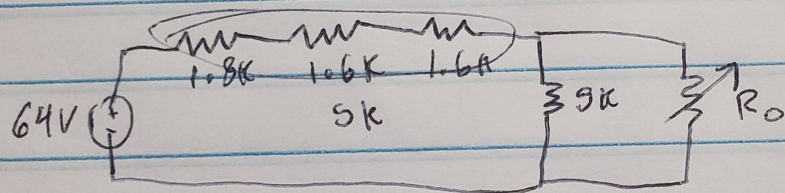
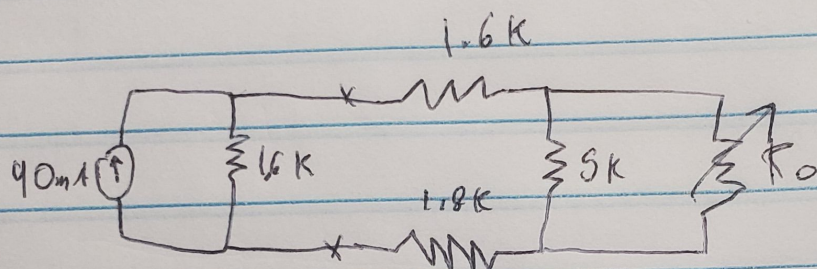
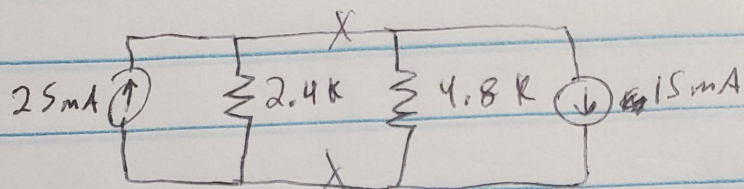
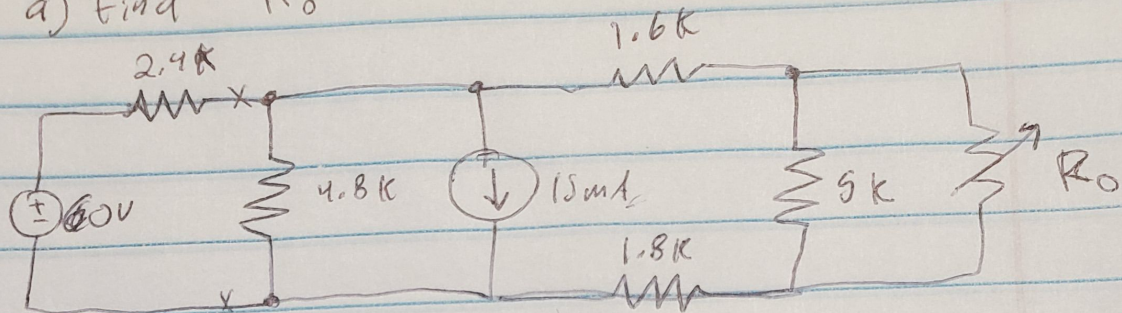


$$i_o = 6.1 \text{ mA}$$

b) 0.2562 W $0.65 + 0.13 + \cancel{0.288}$

~~Find~~ Find the power supplied by the 120V source

4.82 a) Find R_o



$$R = \frac{V_{oc}^2}{P} \quad P = \frac{V_{oc}^2}{R}$$

$$32 = \frac{V_{oc}^2}{2500 + R_o}$$

$$P_L = 0.4096W$$

$$R_o = 2500\Omega$$

b) find max power of R_o

c) find a standard resistor similar to $2.5k\Omega$

$$P_{L2500\Omega} = 0.4432W$$