Ex:

Find $i_x$, $v_1$, and the power dissipated by the dependent source.

\textbf{Solv:} First, we observe that $i_x$ flows thru all 3 resistors since they are in series.

Rather than defining voltages for every resistor, we may use Ohm's law directly to define the voltages as $v = iR$. Note that the + and - signs of the voltage measurements must obey the passive sign convention: the current arrow must point toward the - sign of the v-drop measurement.

Turning to $v$-loop eghs, we discover that all loops pass thru current sources, meaning we should avoid writing these $v$-loop eghs.

\textbf{Note:} even though the dependent current source is labeled with a v-drop, we should avoid using $v_1$ in a $v$-loop. Instead, we can solve the circuit first and then find $v_1$. 
We now write a current-sum eq'n for the top-center node:

\[-5i_x + 8\text{ mA} + i_x = 0\text{ A}\]

or \[4i_x = 8\text{ mA}\]

or \[i_x = 2\text{ mA}\]

Now we use a v-loop around the outside of the circuit to find \(v_1\):

\[-v_1 - i_x 15\text{ k}\Omega - i_x 20\text{ k}\Omega - i_x 10\text{ k}\Omega + 60V = 0V\]

or \[v_1 = -i_x (15\text{ k}\Omega + 20\text{ k}\Omega + 10\text{ k}\Omega) + 60V\]

\[= -2\text{ mA} \cdot 45\text{ k}\Omega + 60V\]

\[= -90V + 60V\]

\[v_1 = -30V\]

The power for the dependent source is

\[p = i \cdot v = 5i_x v_1 = 5(2\text{ mA})(-30V)\]

\[p = -300\text{ mW}\]