4.11

\[ 12V \hspace{1cm} 2A \hspace{1cm} 3A \hspace{1cm} \Rightarrow \hspace{1cm} 2A \hspace{1cm} 2A \hspace{1cm} 1A \]

\[ I_1 = 1A \]

\[ 6V \hspace{1cm} 4A \hspace{1cm} 2A \hspace{1cm} 2A \hspace{1cm} \Rightarrow \hspace{1cm} 2A \hspace{1cm} 4A \]

\[ I_2 = 2A \]

\[ I = I_1 + I_2 = 3A \]

4.22

\[ 2A \]

\[ 4.2 \]

\[ 5 \]

\[ 3A \]

\[ \Rightarrow \frac{5}{4.2} \times 1 = 1.195A \]

4.31

\[ 12V \]

\[ 3A \]

\[ 6A \]

\[ 3A \]

\[ 2V \]

\[ \Rightarrow \frac{3A}{12A} \times 12V = 3V \]

\[ \Rightarrow V_x = 3V \]

\[ \Rightarrow V_x = 3.652 \]
4.36

\[ R_{eq} = 10 \Omega \times 14 \Omega = 8 \Omega \]

\[ V_{th} = 40 \text{ V} \]

\[ I = \frac{40 - 5 \Omega}{12 + 8} = 0.5 \text{ A} \]

4.38

\[ V_o = \frac{10}{10 + 5} \times 19.2 \text{ V} = 12.8 \text{ V} \]

4.41

\[ I_N = -2 \text{ A} \]

\[ R_{th} = 4 \Omega \]

\[ V_{th} = -8 \text{ V} \]
\( (2.5 - 2V_x) \cdot (12 + 6b) = V_x \)

\( V_x = 1.19 \text{ V} \)

\( V_\text{th} = V_x = 1.19 \text{ V} \)

\( \frac{V_x}{12} + \frac{V_x}{6b} + 2V_x = 3 \)

\( 12bV_x = 60 \text{ V} \)

\( b = 2.5 \text{ A} \)

\( R_\text{th} = \frac{V_x}{I} = 0.476 \Omega \)

\[ I_0 = \frac{6}{3k} = 2 \text{ mA} \]

\[ R_\text{th} = 2k \Omega \]

\[ V_{\text{th}} = V_{C2} - 2k = 20 \times 2\text{mA} \times 2k \]

\[ = 80 \text{ V} \]

\[ 3 - 2V_x = 1000I_e \]

\[ V_x = -50 (4+1b) \]

\[ \Rightarrow V_C1 = V_x = 2 \text{ V} \]

\[ \frac{V_x}{50} + 1 = 4 + 1b \]

\[ \Rightarrow R_{\text{th}} = \frac{V_x}{I} = 16.67 \Omega \]
\[ \begin{align*}
V_1 - \frac{3V_1}{3} + \frac{V_1 - V_2}{2} &= 0 \\
V_2 - \frac{V_1}{10} - \frac{V_2}{2} &= 0
\end{align*} \]
\[ \Rightarrow V_{th} = V_2 = 166.67 \text{ V} \]

\[ \begin{align*}
\frac{V_1}{3} + \frac{V_1 + V_1 - V_2}{2} &= 0 \\
\frac{V_2 - \frac{V_2}{2} + V_2 - \frac{V_1}{10} - V_3}{2} &= 0
\end{align*} \]
\[ \Rightarrow i = 16.67 \text{ A} \]
\[ R_{th} = \frac{V_{th}}{i} = \frac{166.67}{16.67} = 10 \Omega \]

4.63

\[ \begin{align*}
\frac{V_1}{3} - \frac{6V_2}{5} - i &= 0 \\
\frac{V_2}{2} = \frac{2}{3}V_1
\end{align*} \]
\[ R_{th} = \frac{V_1}{i} = -3.33 \Omega \]

No independent voltage source or current source, \( V_{th} = 0 \), \( I_{in} = 0 \).