42. (a) In the first case

$$\begin{aligned} i' &= \frac{\mathcal{E}}{R_{\text{eq}}} = \frac{\mathcal{E}}{R_A + R_0 + R_V R/(R + R_V)} \\ &= \frac{12.0\,\text{V}}{3.00\,\Omega + 100\,\Omega + (300\,\Omega)(85.0\,\Omega)/(300\,\Omega + 85.0\,\Omega)} \\ &= 7.09 \times 10^{-2}\ \text{A}\ , \end{aligned}$$

and $V = \mathcal{E} - i'(R_A + R_0) = 12.0\,\text{V} - (0.0709\,\text{A})(103.00\,\Omega) = 4.70\,\text{V}$. In the second case $V = \mathcal{E}R'/(R' + R_0)$, where

$$R' = \frac{R_V\,(R + R_A)}{R_V + R + R_A} = \frac{(300\,\Omega)(300\,\Omega + 85.0\,\Omega)}{300\,\Omega + 85.0\,\Omega + 3.00\,\Omega} = 68.0\,\Omega\ .$$

So $V = (12.0\,\text{V})(68.0\,\Omega)/(68.0\,\Omega + 100\,\Omega) = 4.86\,\text{V}$, and $i' = V(R + R_A) = 4.86\,\text{V}/(300\,\Omega + 85.0\,\Omega) = 5.52 \times 10^{-2}\,\text{A}$.

(b) In the first case $R' = V/i' = 4.70\,\text{V}/(7.09 \times 10^{-2}\,\text{A}) = 66.3\,\Omega$. In the second case $R' = V/i' = 4.86\,\text{V}/(5.52 \times 10^{-2}\,\text{A}) = 88.0\,\Omega$.