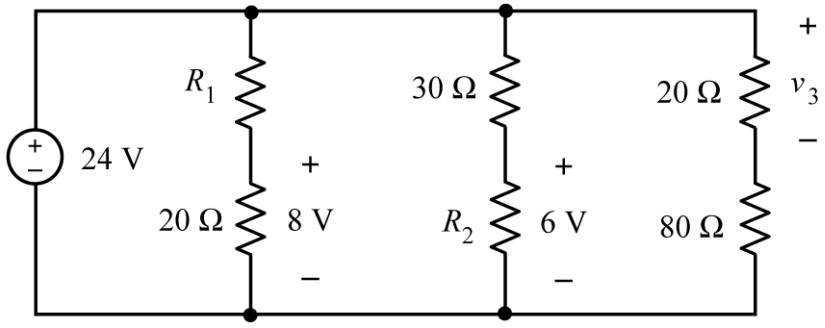
1. Determine the values of R_1, R_2 and v_3:

R_1 = ____40____Ω

R_2 = ____10____Ω

v_3 = ____4.8____V



$$8=\left(\frac{20}{R_1+20}\right)24 \quad\Rightarrow\quad R_1+20=\frac{20(24)}{8}=60 \quad\Rightarrow\quad R_1=40\ \Omega$$

$$6=\left(\frac{R_2}{R_2+30}\right)24 \quad\Rightarrow\quad R_2+30=\frac{24R_2}{6}=4R_2 \quad\Rightarrow\quad R_2=10\ \Omega$$

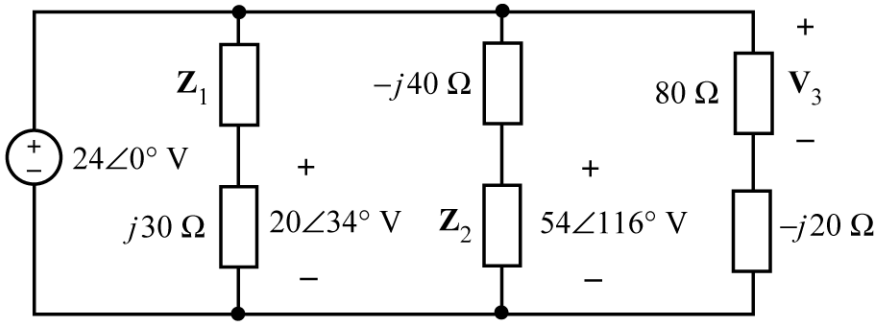
$$v_3=\left(\frac{20}{20+80}\right)24=4.8\ \text{V}$$

2. Determine the values of $\mathbf{Z}_1$, $\mathbf{Z}_2$ and $\mathbf{V}_3$:

$\mathbf{Z}_1$ = __20.1 − j 0.2____Ω

$\mathbf{Z}_2$ = __10 + j 30__Ω

$\mathbf{V}_3$ = __23.3∠14°__V



$$20\angle 34^\circ=\left(\frac{j\,30}{\mathbf{Z}_1+j\,30}\right)24\angle 0^\circ \quad\Rightarrow\quad \mathbf{Z}_1+j\,30=\frac{j\,30(24\angle 0^\circ)}{20\angle 34^\circ}=20.1+j\,29.8 \quad\Rightarrow\quad Z_1=20.1-j\,0.2\ \Omega$$

$$54\angle 116^\circ=\left(\frac{\mathbf{Z}_2}{\mathbf{Z}_2-j\,40}\right)24\angle 0 \quad\Rightarrow\quad \mathbf{Z}_2-j\,40=\frac{(24\angle 0)\mathbf{Z}_2}{54\angle 116^\circ} \quad\Rightarrow\quad -j\,40=\left(\frac{24\angle 0}{54\angle 116^\circ}-1\right)\mathbf{Z}_2$$

$$\Rightarrow\quad \mathbf{Z}_2=10+j\,30.1\ \Omega$$

$$\mathbf{V}_3=\left(\frac{80}{80-j\,20}\right)24\angle 0=23.3\angle 14^\circ\ \text{V}$$