2. a) Use voltage division to find $V_1$.

b) What is $V_1$ if the 40Ω resistor is changed to 400Ω?

![Circuit Diagram]

a) The 100V source and the 40Ω resistor are in parallel. Hence

$V_0 = 100V,$

100V, will be applied across the series connected 10Ω and 20Ω resistors. Use voltage division.

$V_1 = \frac{20}{30} \times 100 = 66.67$ Volts

b) If the 40Ω resistor is changed to 400Ω, it does not change $V_1$. Why? What does change?
The 40Ω to 40Ω resistor is still in parallel with the voltage source and hence presents 100V to the series resistor regardless of its value.

What Changes?

\[
\begin{align*}
\text{Current:} & \quad I_1 = \frac{100}{17.14} = 5.833\, \text{A} \\
\text{Power supplied:} & \quad P_1 = 100 \times 5.833 = 583.33\, \text{W}
\end{align*}
\]

\[
\begin{align*}
\text{Current:} & \quad I_2 = \frac{100}{27.91} = 3.583\, \text{A} \\
\text{Power supplied:} & \quad P_2 = 100 \times 3.583 = 358.3\, \text{W}
\end{align*}
\]

How can this be?

From 17.14Ω to 27.91Ω and the power supplied decreases??