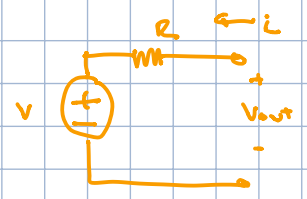
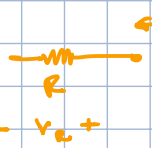
Thevein Equiv is used to simplify a complex circuit into a voltage source and a resistance

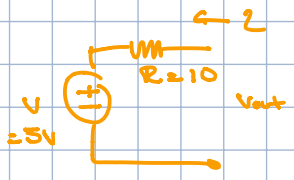


$V_{out} = Ri + V$



(passive sign convention)

So given a circuit, let's set a hypothetical current value through circuit.



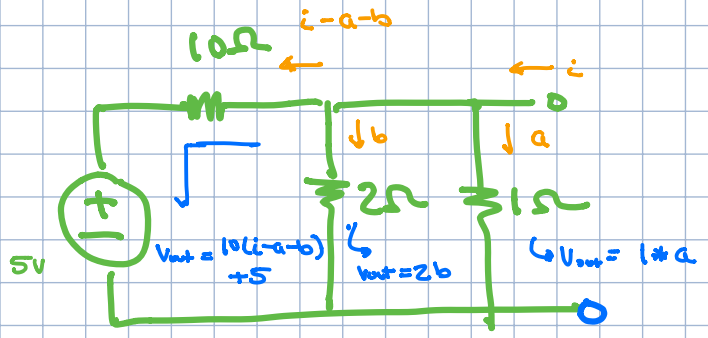
equiv R

$V_o = 10i + 5$ ← voltage

different i values changes voltage output.

↑ current

ex.



$V = 1a = 2b = 10(i-a-b)+5$ (let's take this equation)

$\frac{V}{1} = a$ $\quad \frac{V}{2} = b$

$V = 10\left(i - \frac{V}{1} - \frac{V}{2}\right) + 5$

$V = 10i - 10V - 5V + 5$

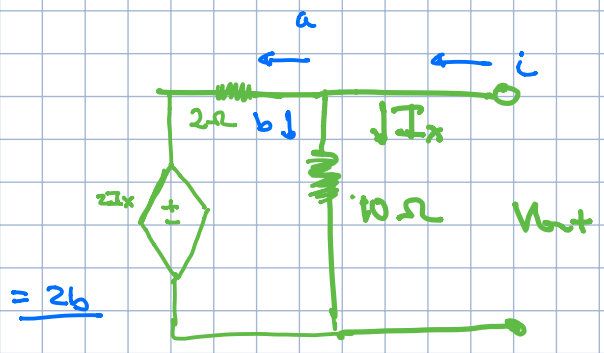
$V = 10i - 15V + 5$

$16V = 10i + 5$

$V = \frac{10}{16} i + 5/16$

↑ equiv R

ex.



$I_x = b$

$= 2b$

$V_{out} = 2b + 2a$ and $V_{out} = 10b$ and $a + b = i$

$b = V_{out}/10$

$a = i - b$

$a = i - \frac{V_{out}}{10}$

$V_{out} = \frac{2V_{out}}{10} + 2a$

$V_{out} = \frac{V_{out}}{5} + 2\left[i - \frac{V_{out}}{10}\right]$

$V_{out} = \frac{V_{out}}{5} + 2i - \frac{V_{out}}{5}$

$V_{out} = 2i$

$R_{eq} = 2$

$V_{eq} = 0V$