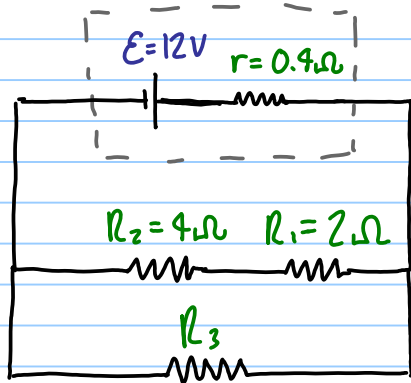


- a) Find the current through the battery
- b) Find the terminal voltage



- c) If a third resistor is added as shown, what will happen to the terminal voltage?  
 i) increase ii) decrease iii) same
- d) Explain your reasoning.

$$\begin{aligned} \text{a.) } R_T &= R_1 + R_2 + r \\ &= 2\Omega + 4\Omega + 0.4\Omega = 6.4\Omega \end{aligned}$$

$$I_T = \frac{\mathcal{E}}{R_T} = \frac{12\text{V}}{6.4\Omega} = 1.9\text{A} \checkmark$$

$$\begin{aligned} \text{b.) } V_{\text{Term}} &= \mathcal{E} - Ir = 12\text{V} - (1.9\text{A})(0.4\Omega) \\ &= 11.3\text{V} \checkmark \end{aligned}$$

c.) decrease  $\checkmark$

d.) Since total resistance decreases, total current increases  $\checkmark$   
more current means greater internal voltage drop  $\checkmark$

$\therefore$  less  $V_{\text{Term}}$

$$V_{\text{Term}} = \mathcal{E} - Ir$$

↓                    ↑