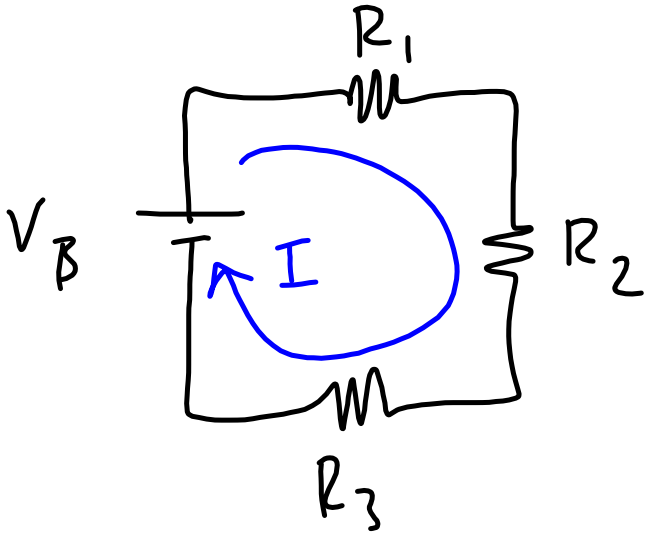
Series and Parallel Circuits

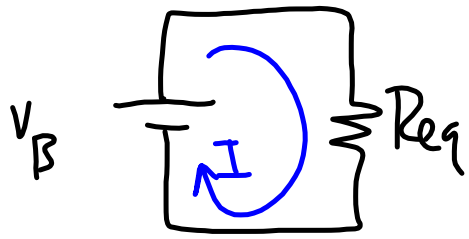
1.



$V_1 = IR_1 = 1.09\,V$

$V_2 = IR_2 = 4.36\,V$

$V_3 = IR_3 = 6.54\,V$



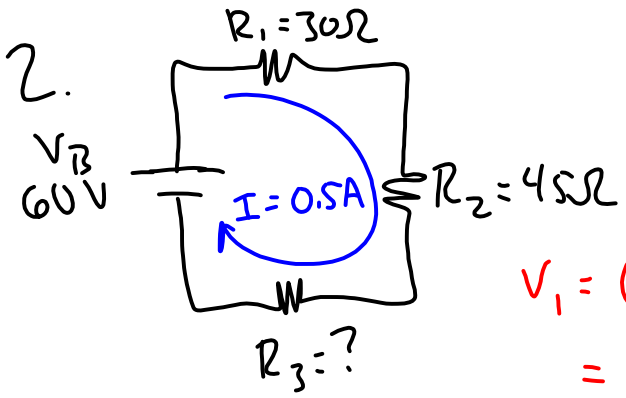
$R_{eq} = R_1 + R_2 + R_3$

$= 1\Omega + 4\Omega + 6\Omega$

$= 11\Omega$

$$I = \frac{V_B}{R_{eq}} = \frac{12\,V}{11\,\Omega} = 1.09\,A$$

2.



$V_1 = (0.5A)(30\Omega)$

$= 15V$

$V_2 = (0.5A)(45\Omega)$

$= 22.5V$

$V_B = V_1 + V_2 + V_3$

$V_3 = V_B - V_1 - V_2 = 60V - 15V - 22.5V$

$= 22.5V$

$R_3 = \frac{V_3}{I} = \frac{22.5V}{0.5A} = 45\Omega$

$R_{eq} = R_1 + R_2 + R_3 = 30\Omega + 45\Omega + 45\Omega = 120\Omega$

$R_{eq} = \frac{V_B}{I} = \frac{60V}{0.5A} = 120\Omega$

$R_{eq} = R_1 + R_2 + R_3$

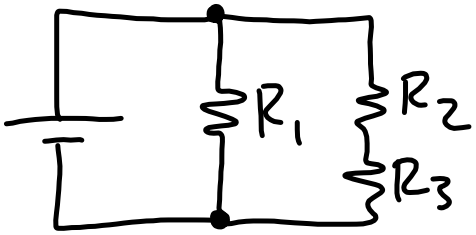
$R_3 = R_{eq} - R_1 - R_2 = 120\Omega - 30\Omega - 45\Omega$

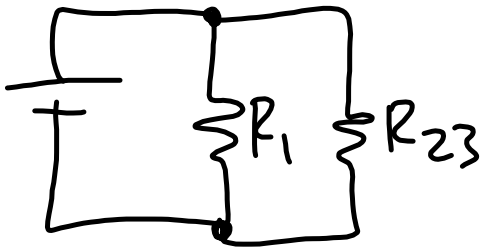
$= 45\Omega$

Terms that are equivalent:

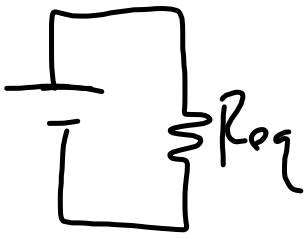
- Electric potential
- Potential difference
- Voltage
- Voltage drop

- Combination Circuits



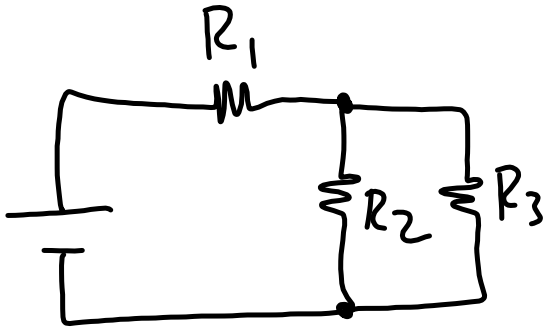


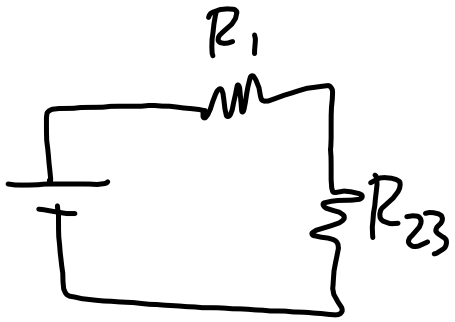
$$R_{23} = R_2 + R_3$$



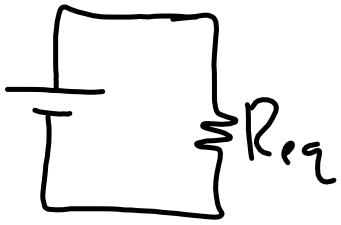
$$R_{eq} = \left[\frac{1}{R_1} + \frac{1}{R_{23}}\right]^{-1}$$

- Another combination circuit





$$R_{23} = \left[\frac{1}{R_2} + \frac{1}{R_3}\right]^{-1}$$



$$R_{eq} = R_1 + R_{23}$$