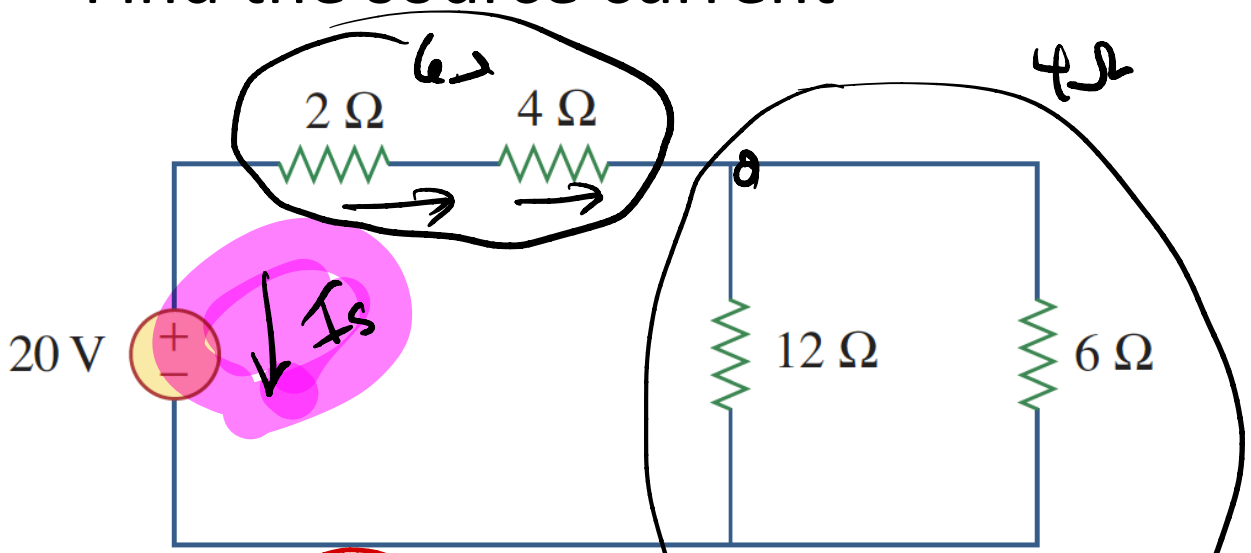
Basics – 5

equivalent resistance

Applying Series/Parallel Ideas

- Find the source current



1- series R

2 + 4 = 6 Ω

2- parallel R

$\frac{12 \cdot 6}{12+6} = 4\ \Omega$

3- Serie R

6 + 4 = 10 Ω

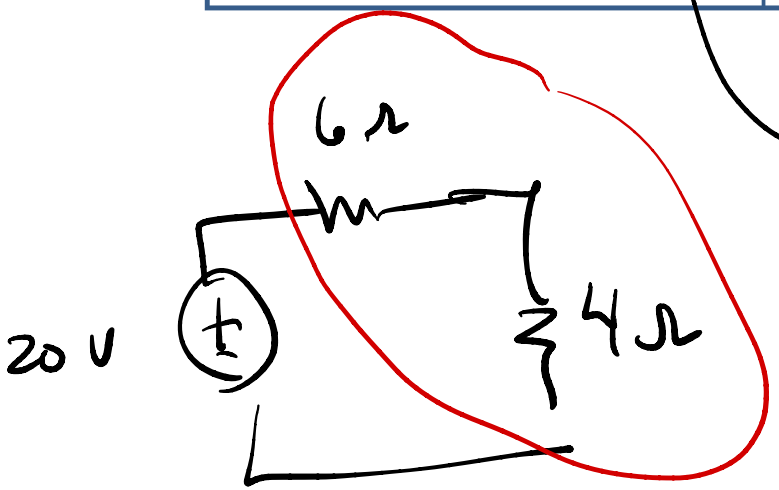
4- KVL

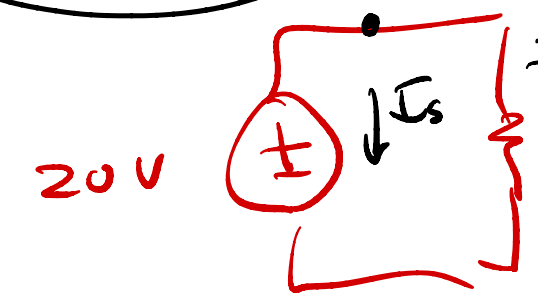
$V_R = 20V$

5. Ohm

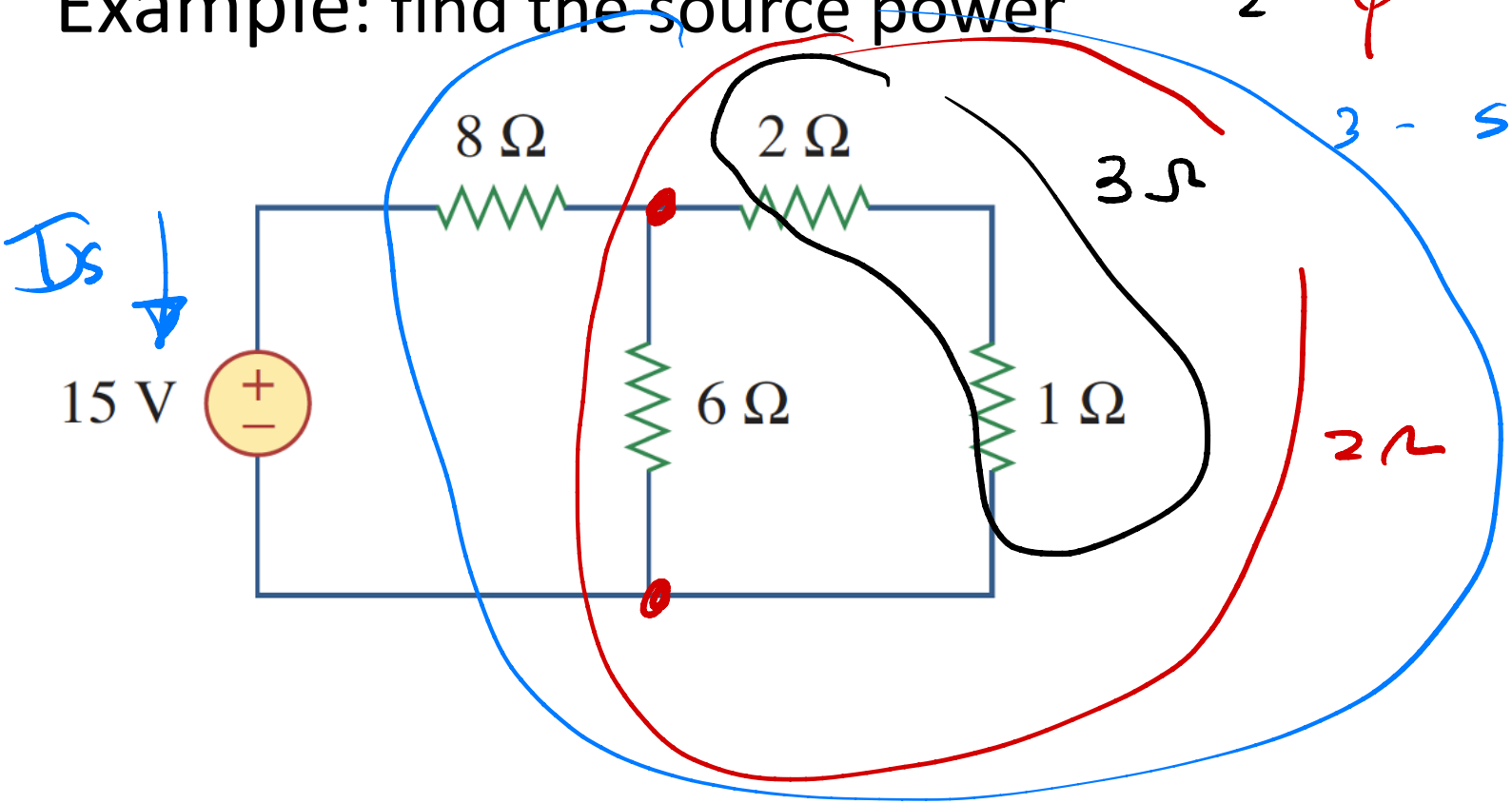
$i_R = 2A$

6- KCL $i_S = -2A$





Example: find the source power

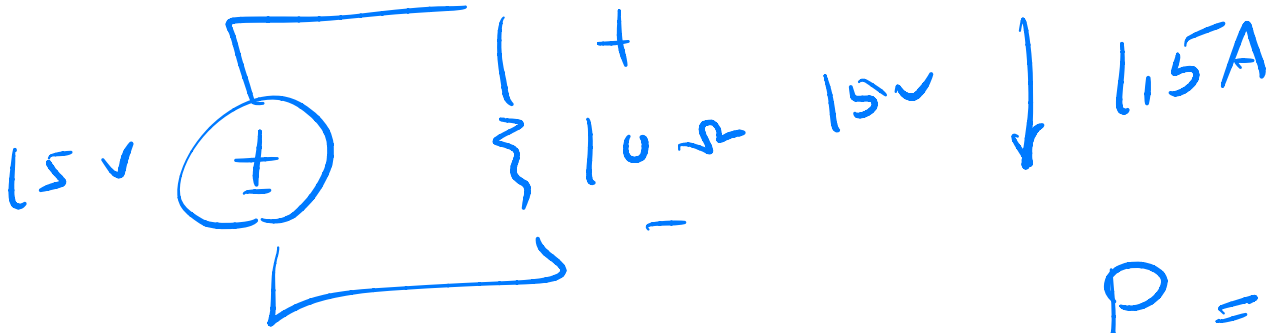


1- series

2 - parallel

3 - series

4. $I_s = -1.5\ A$

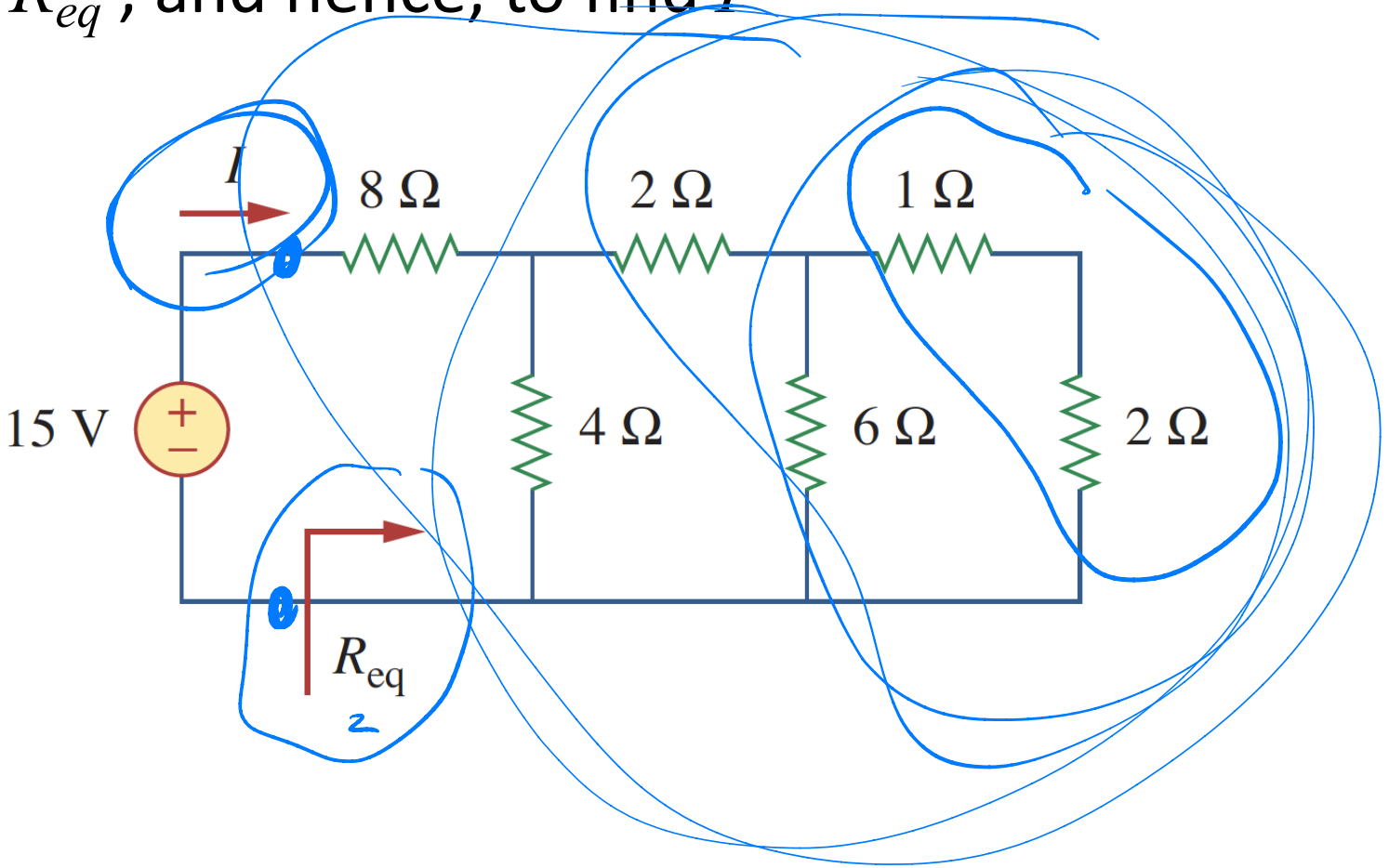


$P_s = V \cdot i_s$

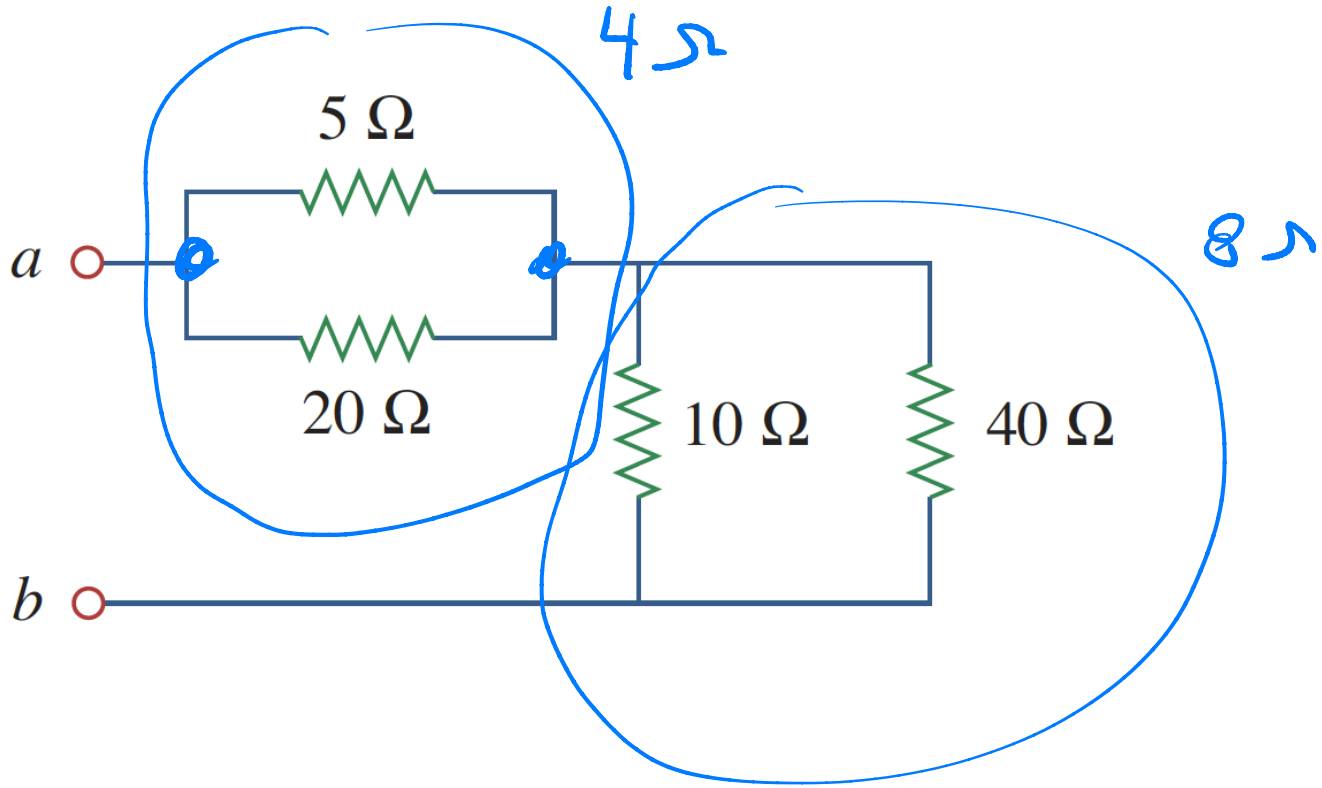
$= 15 \cdot -1.5 = -22.5\ W$

Equivalent Resistance

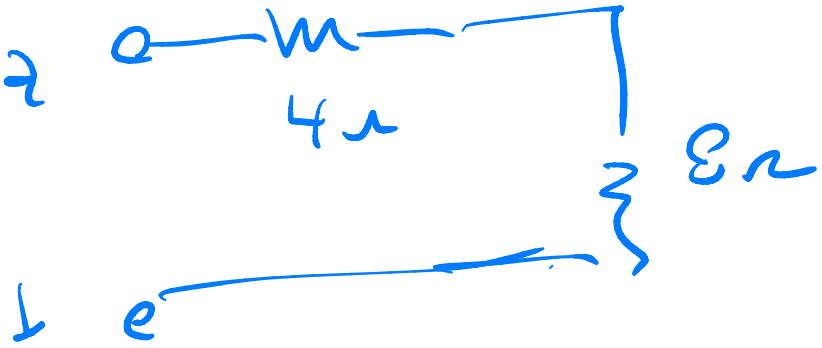
- Concept – use series and parallel combining to find R_{eq} , and hence, to find I



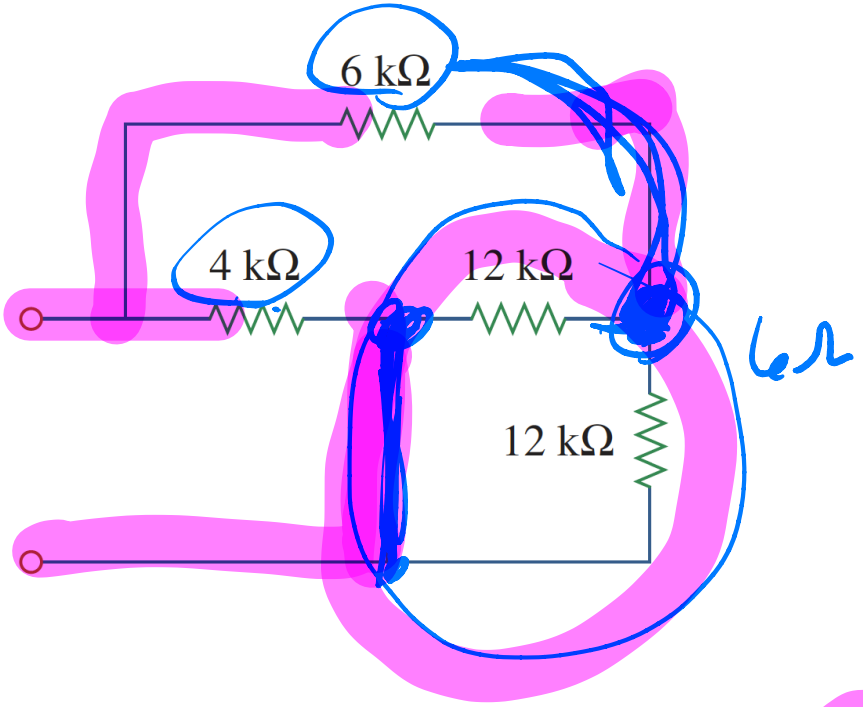
Example:

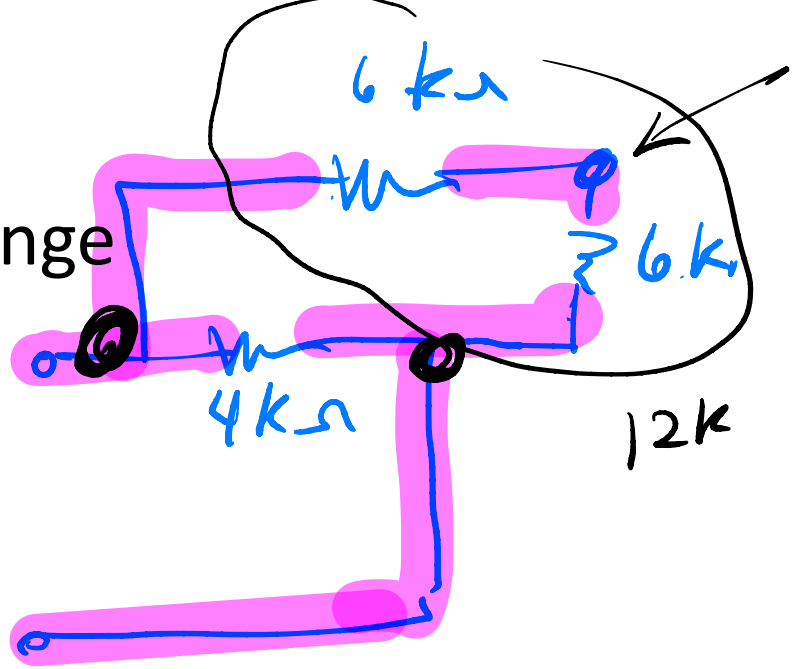


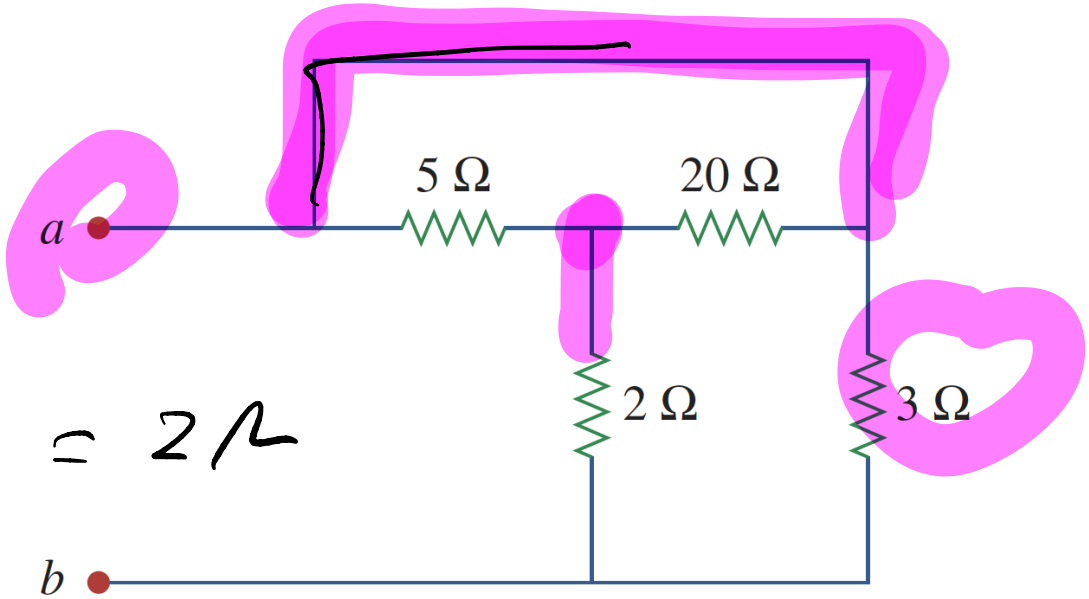
$R_{eq} = 12\ \Omega$



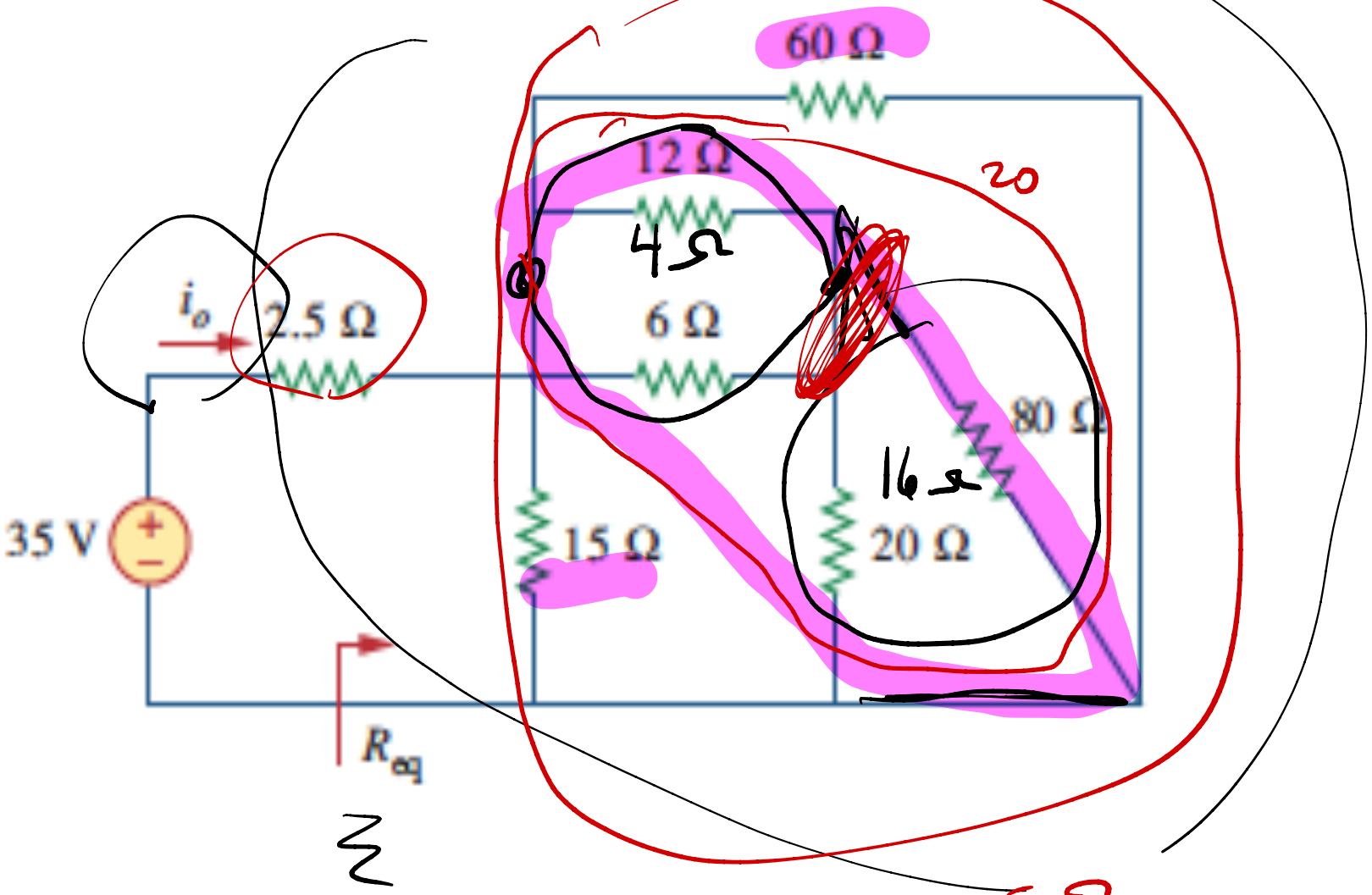
Sometimes the circuit looks strange





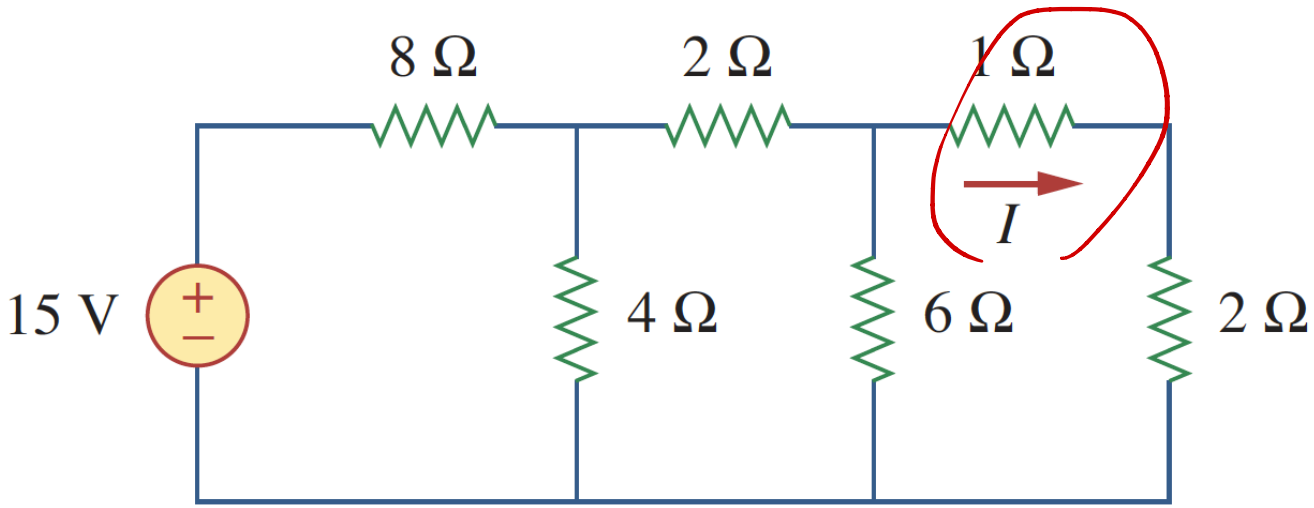


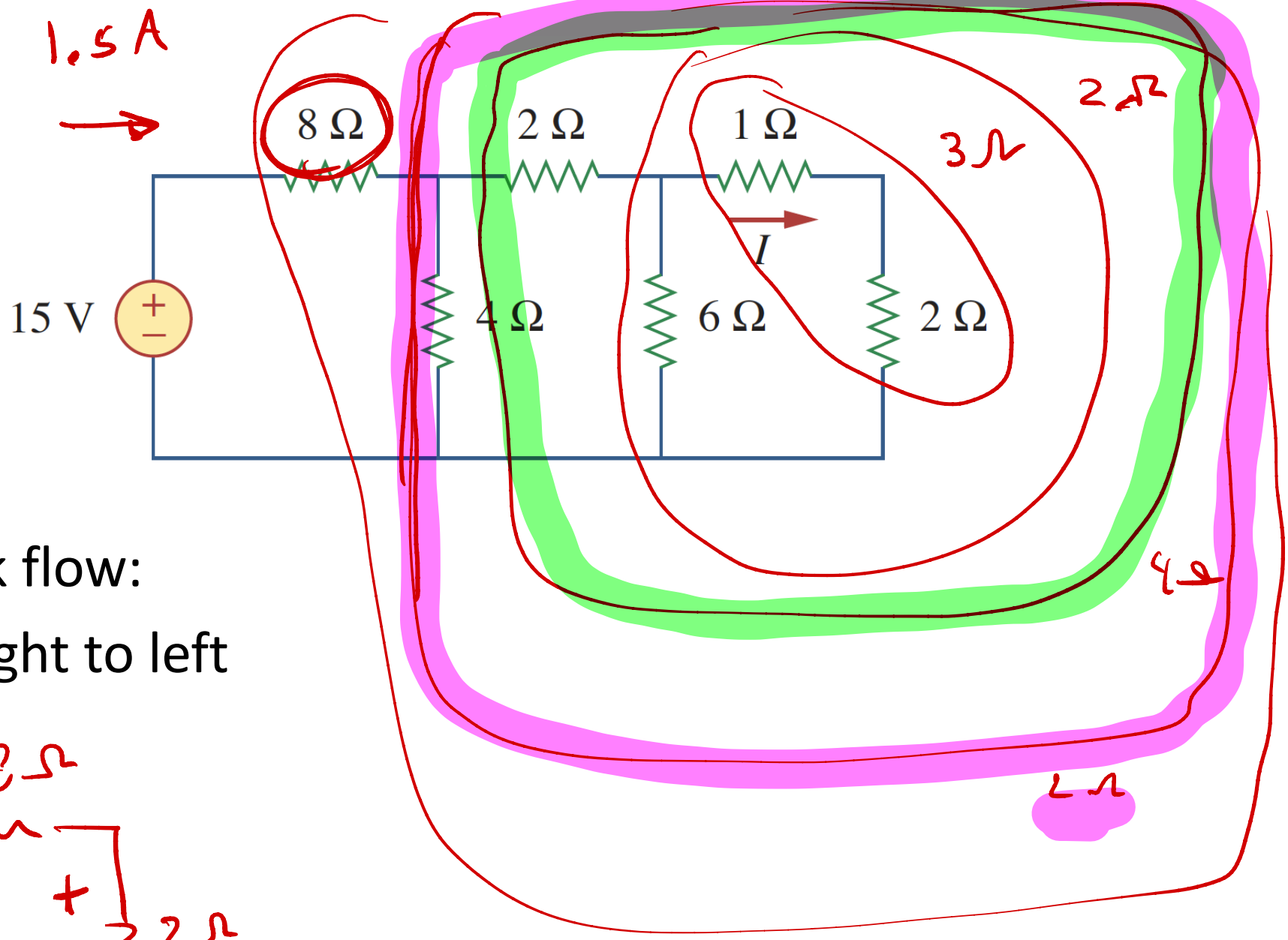
Example: find R_{eq} and i_o



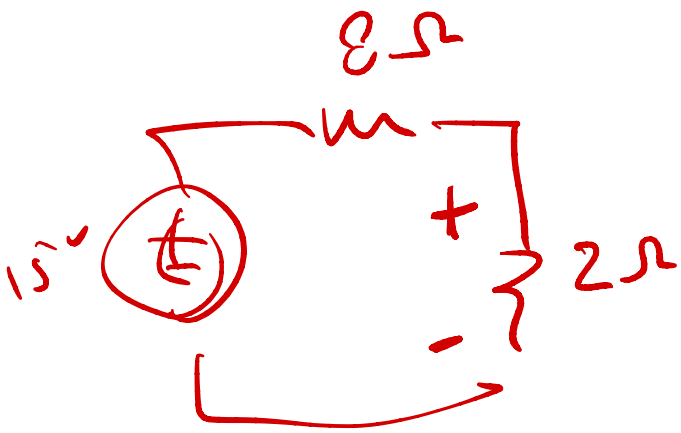
Circuit Analysis

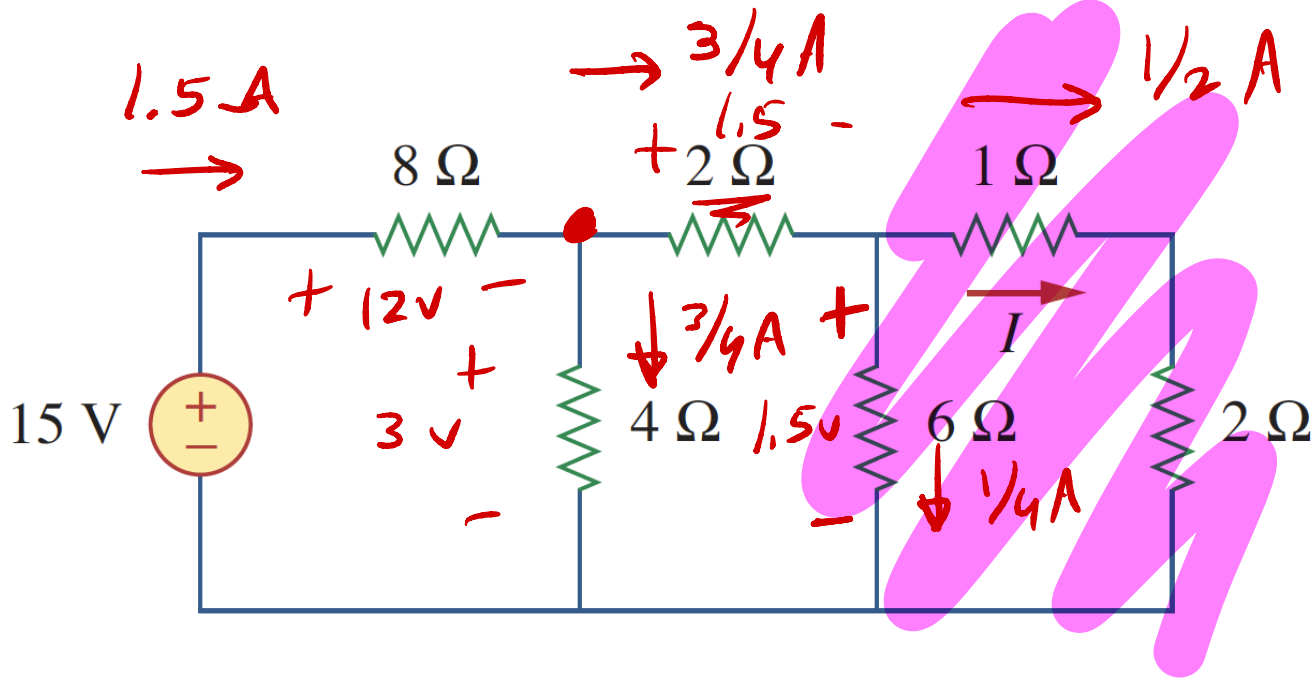
- Sometimes we can do a full analysis using just series/parallel combining and voltage/current division
- Example: find I **(next slide)**





- Work flow:
  - Right to left





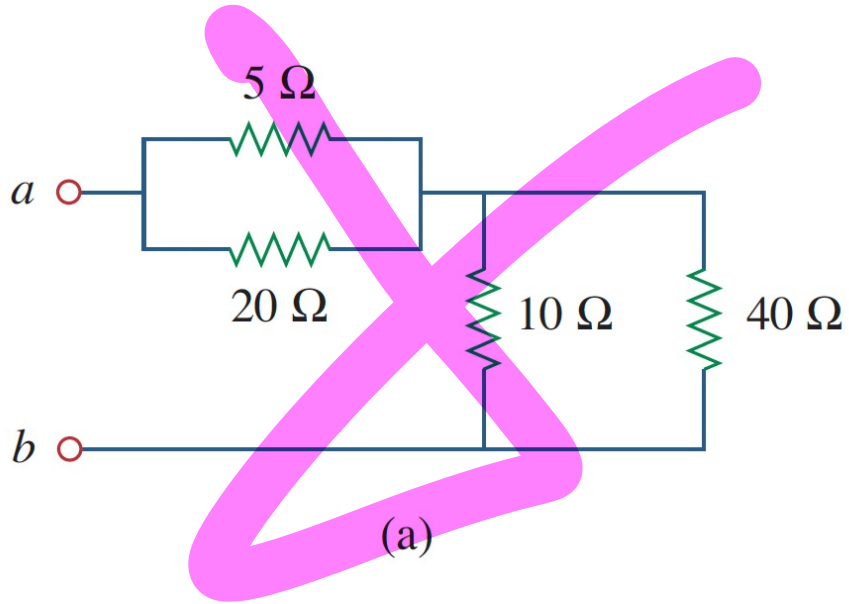
0.5 A

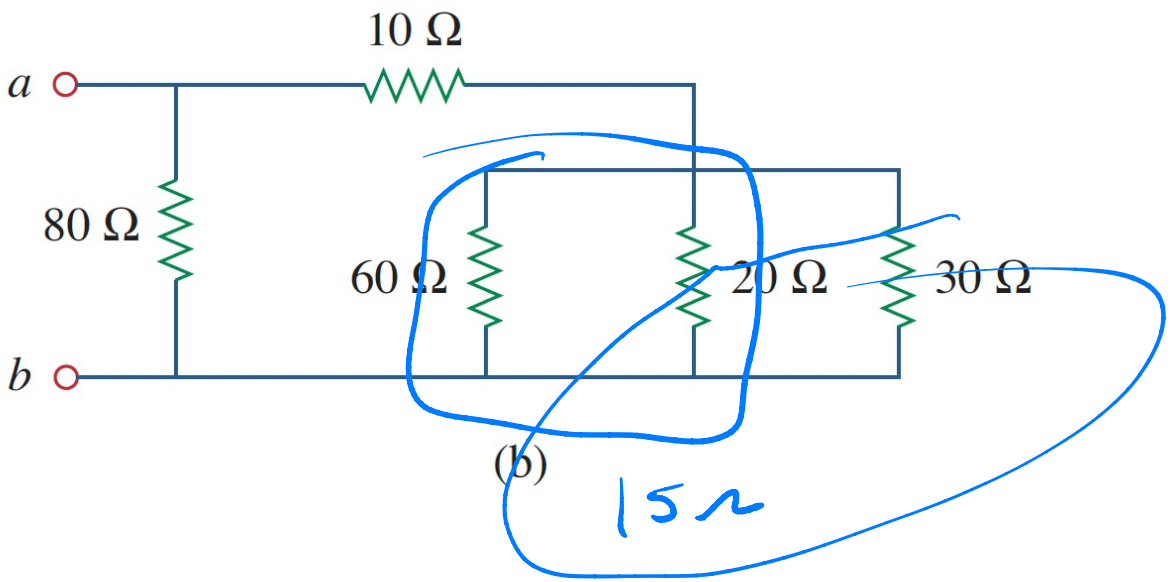
- Work flow:
  - Left to right

12 Ω, 15 Ω

16

Practice problems: find the equivalent resistances



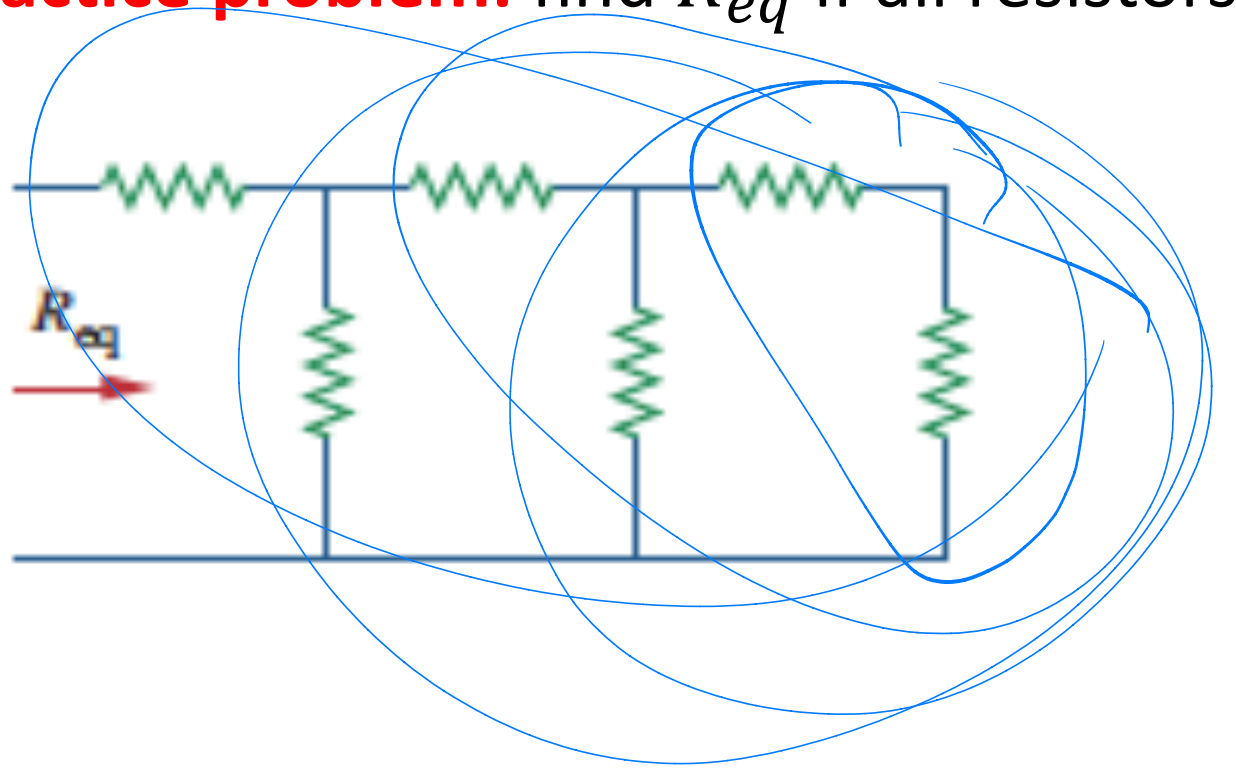


10 Ω

15 Ω

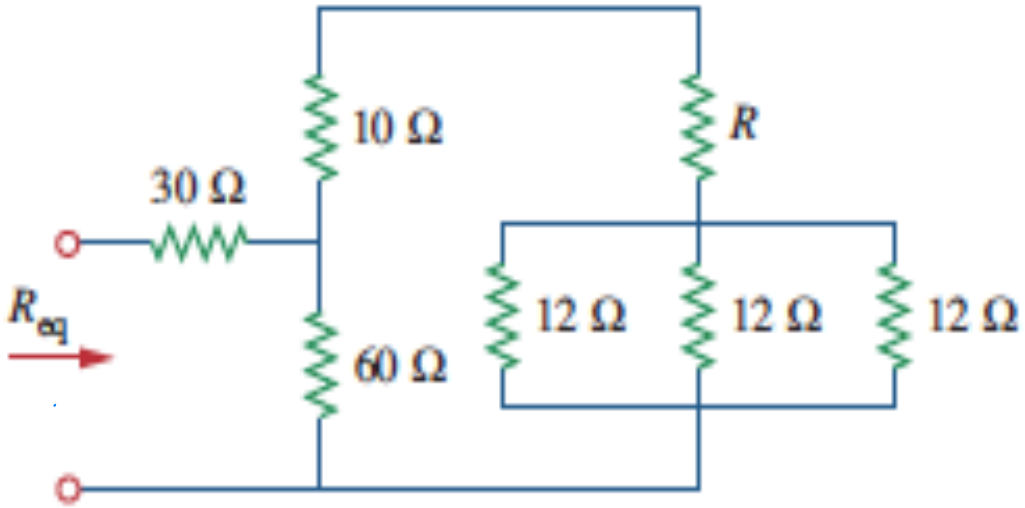
13 Ω

Practice problem: find R_{eq} if all resistors are 8 Ω



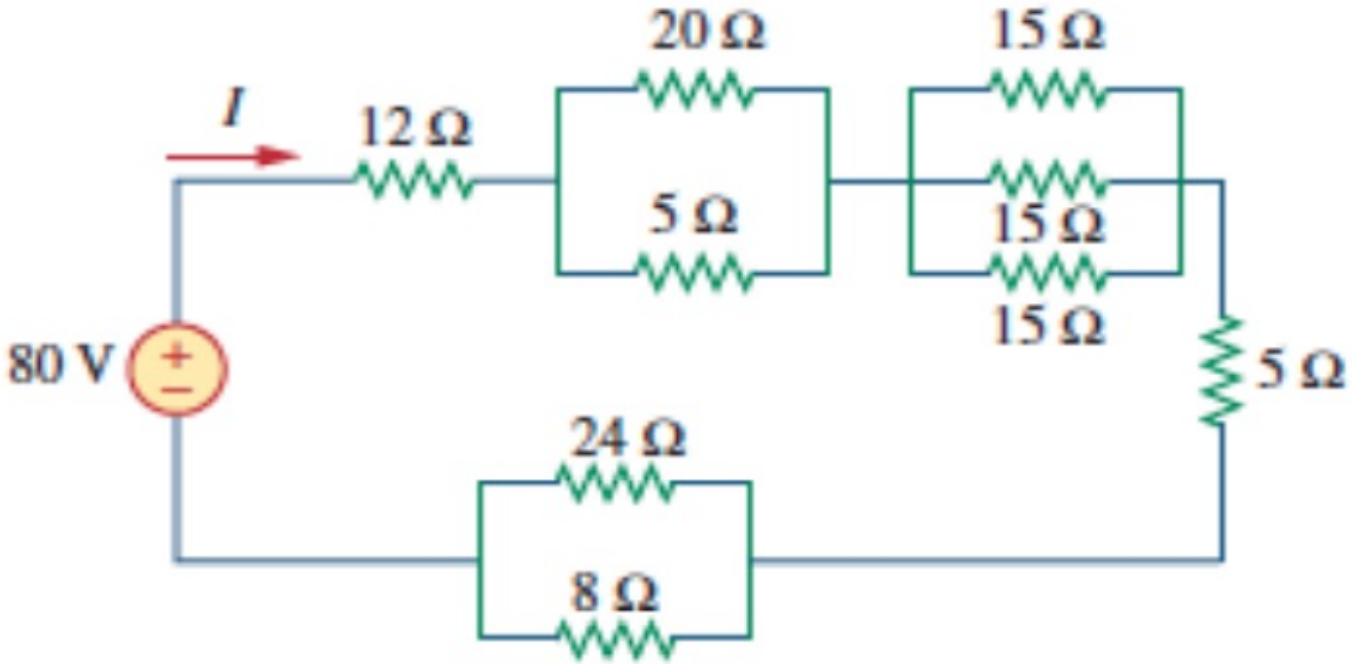
16 Ω

Practice problem: if $R_{eq} = 50\ \Omega$, find R



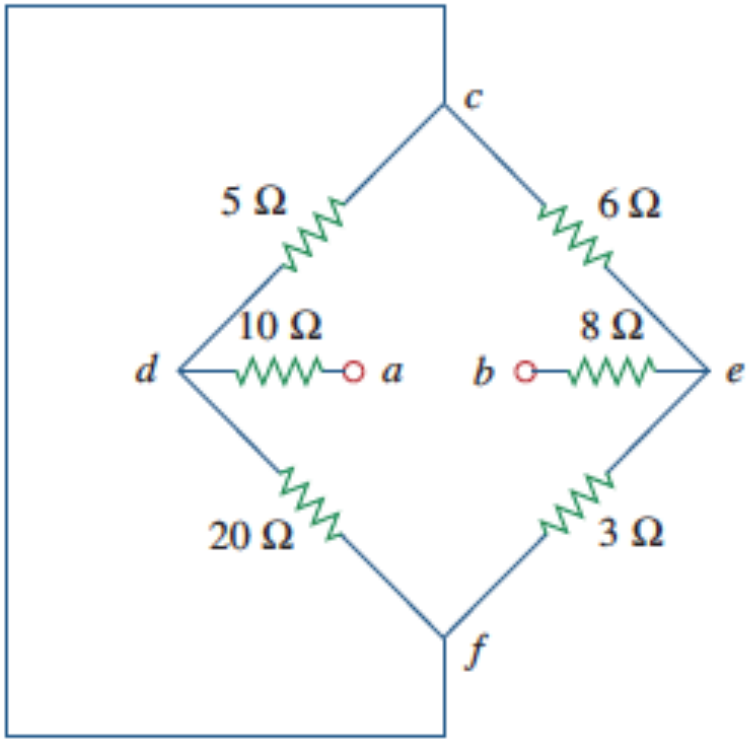
2.5 A

Practice problem: find I



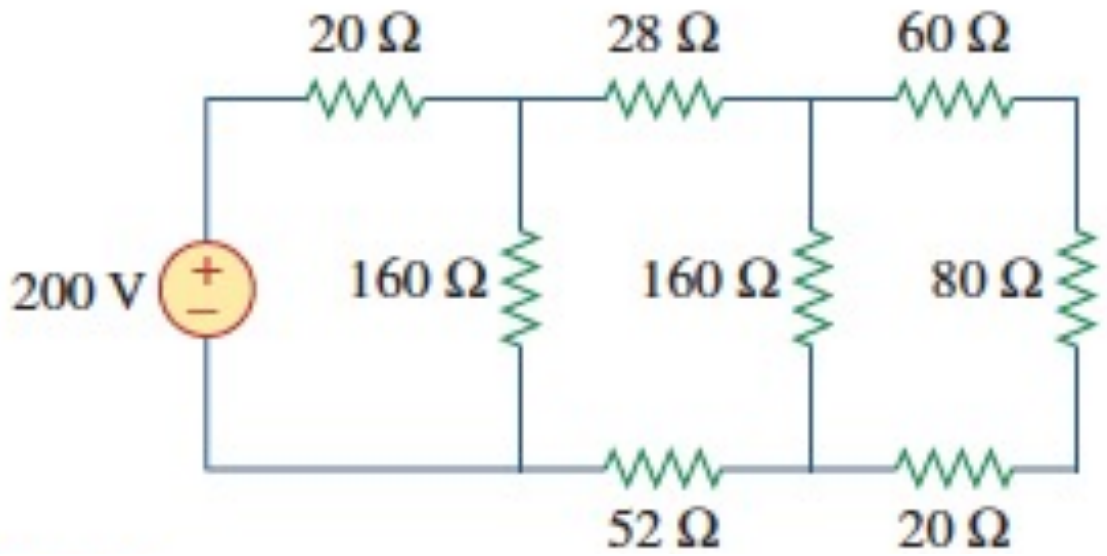
24 Ω

Practice problem: find the equivalent resistance at a-b



$-400\ W$

Practice problem: find the source power



$20\ V$

Practice problem: find v