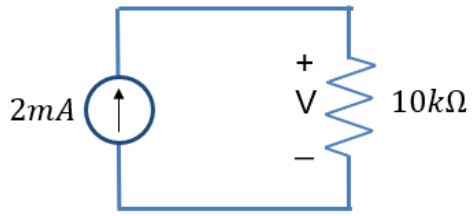
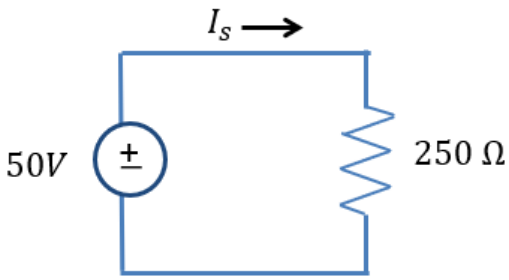
- **Current** is measured **through** an interface
- **Voltage** is measured **between** two points
- **Independent sources** are drawn with a circle. They produce a constant current (arrow) or voltage (plus and minus signs).
- **Resistors** have a linear relationship between its current and voltage, V = IR (known as **Ohm's law**)
- **Kirchhoff's Current Law (KCL):** The sum of all currents entering (or leaving) any node of a circuit must be zero.
- **Kirchhoff's Voltage Law (KVL):** The sum of all voltage drops around any closed loop in a circuit must be zero.

Basic examples

1

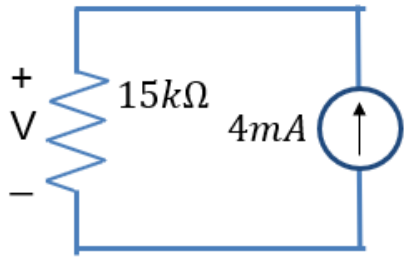


2



Try slight variations

3



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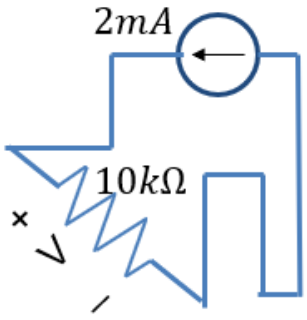

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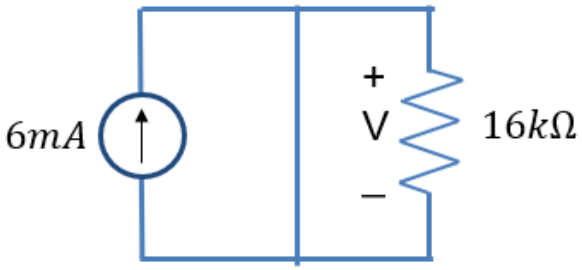
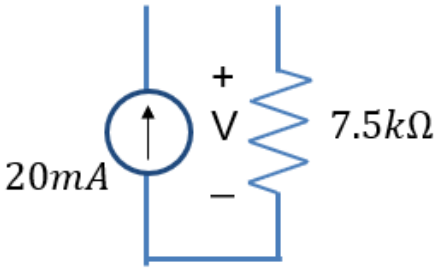
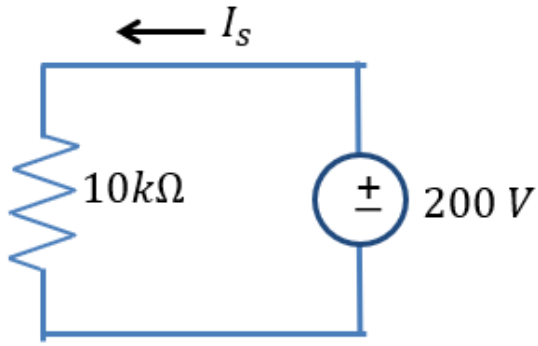

6mA
+
V
–
16kΩ

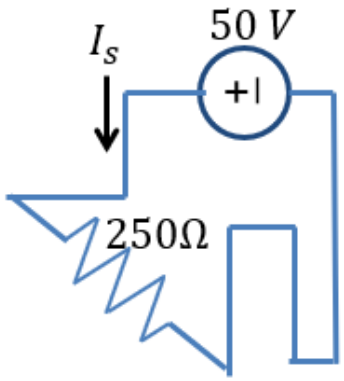
6


20mA
+
V
–
7.5kΩ

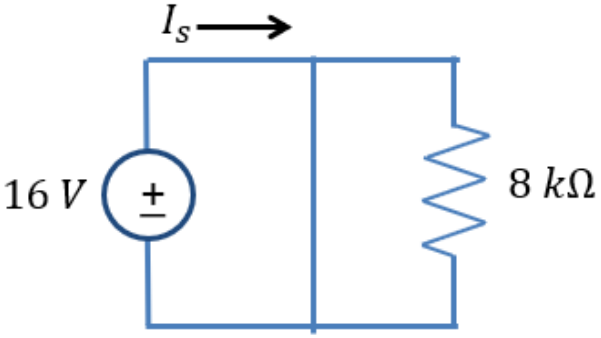
7


I_s
10kΩ
±
200 V

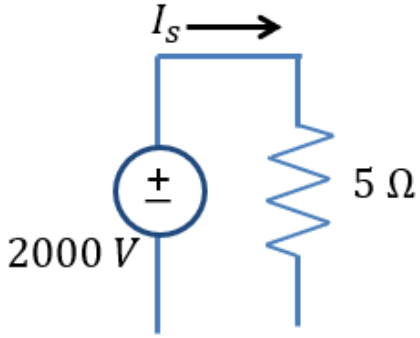
8


I_s
50 V
+
250Ω

9

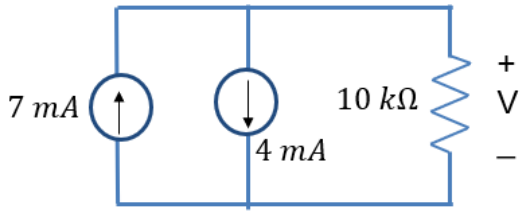

I_s
16 V
±
8 kΩ

10

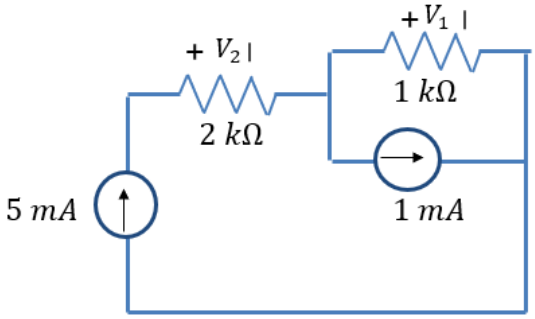

I_s
±
2000 V
5 Ω

Apply Kirchhoff's laws

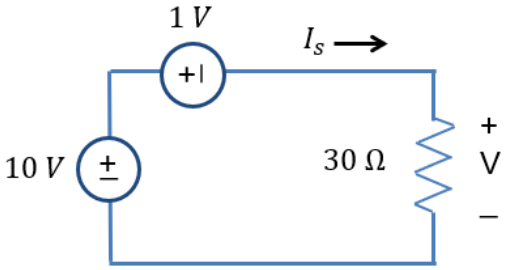
11



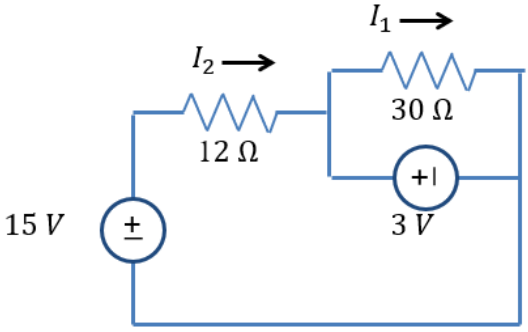
12



13

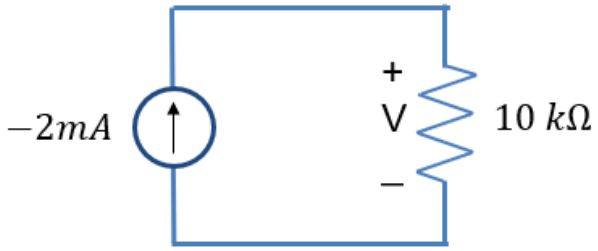


14

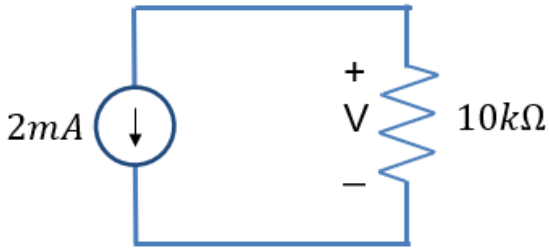


Watch your signs! Ohm's law applies if current is oriented *entering* the resistor where the plus side of the voltage measurement is taken.

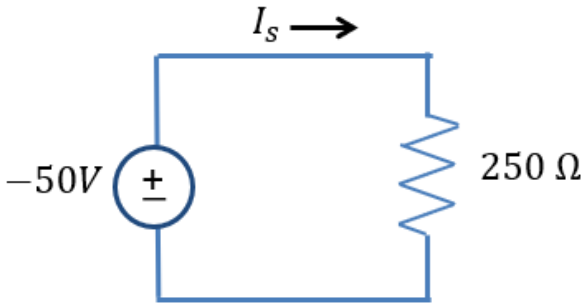
15



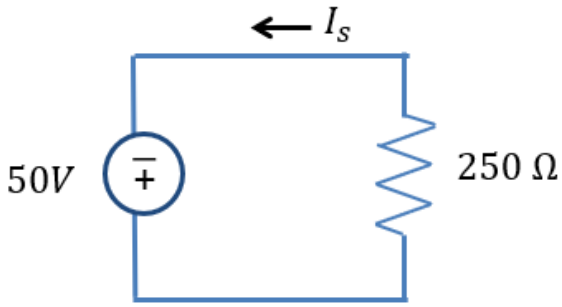
16



17

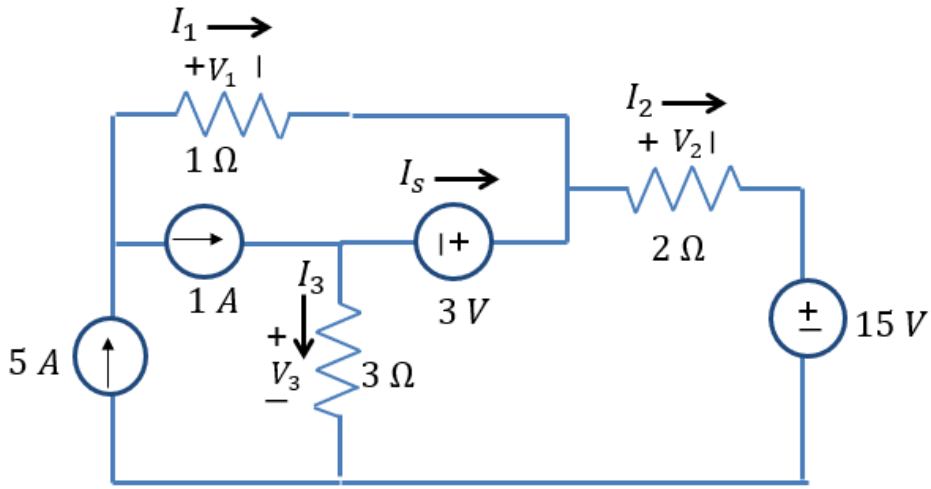


18



A bigger example

19


I_1
$+V_1$ −
1 Ω
I_2
+ V_2 −
2 Ω
I_s
1 A
I_3
3 V
+
V_3
−
3 Ω
5 A
+
−
15 V