B

40.0 Ω

70.0 Ω

A

60.0 Ω

C

20.0 Ω

50.0 Ω

D

20.0 V
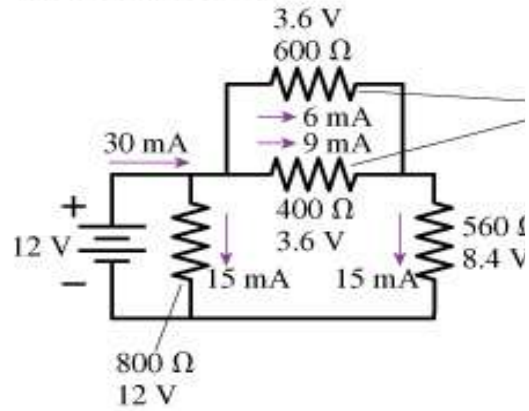
Circuit with no series or parallel resistors.

We don't do these.

Simplifying Complex Circuits

- Identify nodes, common nodes, branches, & shorts

- If a branch has more than one resistor, replace with R_s, redraw circuit

- If there are parallel resistors (nothing but one resistor in each branch), replace with R_P & redraw circuit.

- Stop when you get to a single resistance.

Simplifying Complex Circuits

- Work back up diagrams
- If current resistor is a Series replacement, each resistor has same current. Use $V = IR$ to get voltage for each.
- If current resistor is a Parallel replacement, each resistor has same voltage. Use $I = V/R$ to get current for each.

(b) Rebuild the circuit

3.6 V
600 Ω
⟶ 6 mA
⟶ 9 mA
30 mA
400 Ω
3.6 V
12 V
560 Ω
8.4 V
15 mA   15 mA

800 Ω
12 V

(b) Rebuild the circuit

12 V
+
12 V
400 Ω
12 V
30 mA

0.10 A, 11 V

110 Ω

A

13/470 A, 22*13/47 V

110 Ω

A

+ 24 V

220 Ω

180 Ω

+ 24 V

180 Ω

470 Ω

250 Ω

13 V, 13/180 A

B

13/470 A, 25*13/47 V

B

(a)

0.10 A, 11 V

110 Ω

A

13 V, 13/470 A

110 Ω

A

+ 24 V

180 Ω

470 Ω

+ 24 V

130 Ω

B

B

13 V, 13/470 A

(b)

110 Ω

A

0.10 A, 11 V

+ 24 V

130 Ω

+ 24 V

240 Ω

24 V, 0.10 A

0.10 A, 13 V

B

(c)