**Notes on Parallel Circuits**

[What is a Parallel Circuit](https://www.youtube.com/watch?v=YaBdEvJpvMk&t=33s)  
In a Parallel circuit, you can turn off one light without turning off all of the lights. This is because there are multiple pathways in which the electrons can travel.

[Comparing Series and Parallel Circuits](https://www.youtube.com/watch?v=x2EuYqj_0Uk)

In Series circuits, there is only one pathway for electricity to travel.  
When more resistance is added, the current goes down and the bulbs are not as bright.  
Current is same everywhere in a series circuit.  
Sum of voltage drop will equal total voltage.

In Parallel circuits, there are multiple pathways for electricity to travel.  
When more resistance is added, the current is increased and the bulbs remain bright.  
Sum of two current pathways will equal total current.

[How to solve a Parallel Circuit](https://www.youtube.com/watch?v=h_yPktKnHq4&t=170s)

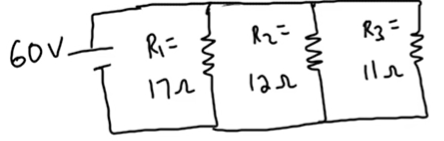
Solving for Resistance, Current, and Voltage in a Parallel circuit.

Rules:   
1- Resistance: Total resistance varies inversely with the current. Resistance is inverse to current.  
1/RT = 1/R1 + 1/R2 + 1/R3…

2- Current: Current is being lost at each branch, then adds up to what it was.  
IT = I1 + I2 + I3…

3- Voltage: The same throughout.  
ΔVT= ΔV1 =ΔV2 =ΔV3

4- Ohms Law  
V= IR



Given information is BLUE.  
Solved information is in BLACK.

|  |  |  |
| --- | --- | --- |
| RT = 4.29Ω | IT = 13.9 A | VT = 60 V |
| R1 = 17Ω | I1 = 3.5 A | V1 = 60 V |
| R2 = 12Ω | I2 = 5.0 A | V2 = 60 V |
| R3 = 11Ω | I3 =5.4 A | V3 = 60 V |

Step 1- Place given information in chart.  
Step 2- Voltage is equal throughout.  
Step 3- Solve for total resistance in circuit  
 1/RT = 1/R1 + 1/R2 + 1/R3…  
 1/RT = 1/17 + 1/12 + 1/11   
 1/RT = 0.233  
 RT = 1/0.233  
 RT = 4.29Ω

Step 4- Solve for total current  
 V=IR, where I = V/R

IT= 60 V/4.29 Ω  
 IT = 13.9 A

Step 5- Solve for I1, I2, and I3  
 Using I=V/R

I1 = 60V/17Ω  
 I1 = 3.5 A

I2 = 60V/12Ω  
 I2 = 5.0 A

I3 = 60V/11Ω  
 I3 = 5.4A