# Series and Parallel Circuits Worksheet

Use the chart to answer each of the following questions. Be sure to place a box around the calculated values requested.

1. A 20 Ohm lamp and a 5 Ohm lamp are connected in series and placed across a potential difference of 50 V. What is the equivalent resistance of the circuit? What is the voltage drop across each lamp? What is the power dissipated in each lamp?
2. Three identical lamps are connected in series to a 6 V battery. What is the voltage drop across each lamp?
3. The load across a battery consists of two resistors, with values of 15 Ohm and 45 Ohm connected in series. What is the total resistance of the load? What is the voltage of the battery if the current in the circuit is 0.1 A?
4. A lamp having a resistance of 10 Ohm is connected across a 15 V battery. What is the current through the lamp? What resistance must be connected in series with the lamp to reduce the current to 0.5A?
5. A 75 W bulb is connected to a 120 V source. What is the current through the bulb? What is the resistance of the bulb? A lamp dimmer puts a resistance in series with the bulb. What resistance would be needed to reduce the current to 0.3 A?
6. Three identical lamps are connected in parallel to each other and then connected to a 6 V battery. What is the voltage drop across each lamp?
7. A 16 Ohm and a 20 Ohm resistor are connected in parallel. A difference of potential of 40 V is applied to the combination. Compute the equivalent resistance of the parallel circuit. What is the current in the circuit? How large is the current through the 16 Ohm resistor?
8. A circuit contains a 10 Ohm heater and six 240 Ohm lamps, each containing a 60 Watt bulb, all connected in parallel. The voltage across the circuit is 120 V. What is the current in the circuit when only 4 lamps are turned on? What is the current in the circuit when all the lamps are turned on? What is the current in the circuit when all six lamps and the heater are turned on? If the circuit has a fuse which will melt if the current exceeds 12 A, will the fuse melt?
9. Three 15 Ohm resistors are connected in parallel and placed across a 30 V potential difference. What is the equivalent resistance of the parallel circuit? What is the current through the entire circuit? What is the current though each branch of the parallel circuit?
10. A 12 Ohm resistor and a 15 Ohm resistor are connected in parallel and placed across the terminals of a 15 V battery. What is the equivalent resistance of the parallel circuit? What is the current through the entire circuit? What is the current though each branch of the parallel circuit?
11. The current out of the source in the figure below is 5 mA. How much current does each milliammeter in the circuit indicate?
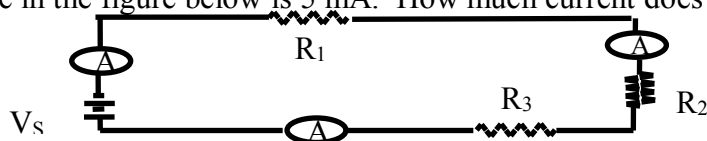

12. The following resistors (one each) are connected in a series circuit. 1, 2, 5, 12 and 22 Ω. Determine the total resistance.
13. If the total resistance in the figure below is 18 kΩ, what is the value of R - 5?
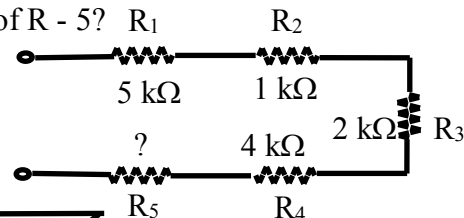

14. What is the current in the circuit to the right?
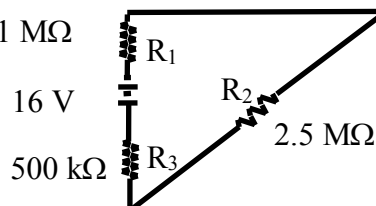
15. Four equal - value resistors are in series with a 5 V battery and 2.5 mA are measured. What is the value of each resistor?
16. Five resistors are in series with a 20 V source. The voltage drops across four of the resistors are 1.5 V, 5.5 V, 3 V, and 6 V. How much voltage is dropped across the fifth resistor?
17. In the circuit below, determine the resistance of R_4.
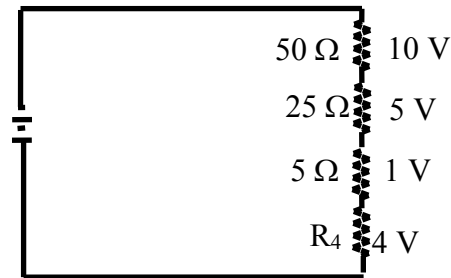
18. If there are 10 V across R_1 in the figure below, what is the voltage across each of the other resistors?
19. Five series resistors each handle 50 mW. What is the total power?
20. How much voltage would you read in AB, AC, CD, EC?
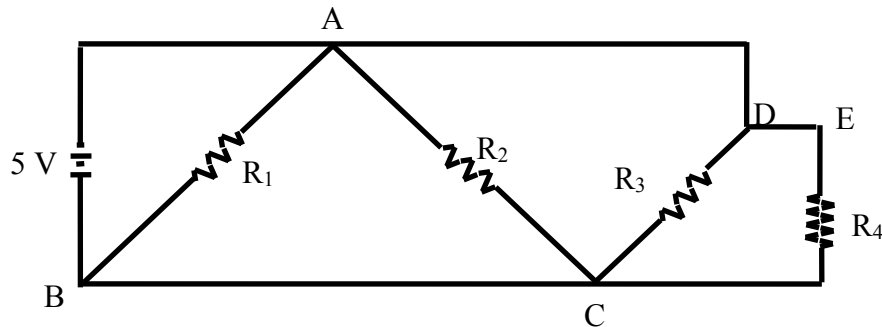
21. The following resistors are in parallel: 1000, 800, 500, 200, and 100 Ω. What is the total resistance?
22. Suppose that you need a total resistance of 100 Ω. The only resistors that are immediately available are. 200 Ω. How you can make 100 Ω resistance?
23. Three 600 Ω resistors are connected in parallel, and 5 V are applied across the parallel circuit. How much current is there out of the source?
24. Six resistors of 300 Ω are connected as series of 2 groups of 3 parallel resistors. What is the total resistance?
25. Each branch in a five branch parallel circuit has 2 resistors of 200 Ω. What is the total resistance?
26. Determine the unknown resistances in the circuit in the figure below.
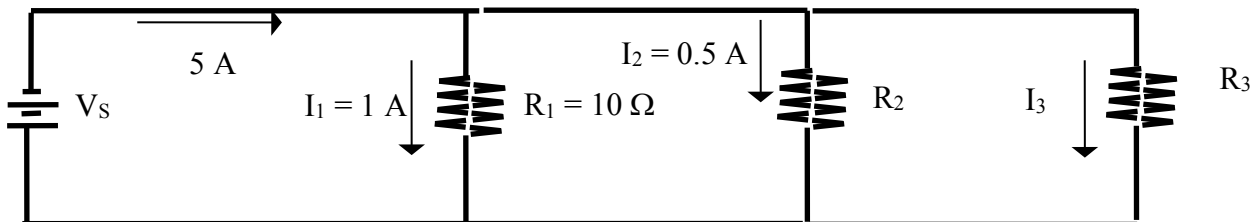
27. What resistance value in parallel with 100 Ω produces a total resistance of 40 Ω?
28. In a kitchen, three 75 W bulbs are connected in parallel across 120 V. All three bulbs are on. At 6:00 am, a 360 W coffeepot also in parallel is turned on. Calculate the total current drawn.
29. Find the resistance that must be put in series with a resistor of 400 Ω such that, when 120 V is applied across the combination, the current in the circuit will be 0.010 A.
30. A 10 Ω resistor, a 11 Ω resistor and a 39 Ω resistor are connected in series across a potential difference of 120 V. Calculate the voltage drop across the 10 Ω resistor.
31. Three resistors, whose values are 35 Ω, 45 Ω, and 85 Ω, are connected in parallel across a 35 V battery. What is the current through the 35 Ω resistor?