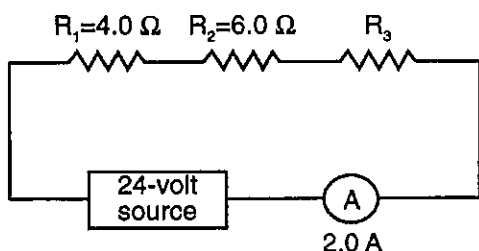


Series: $R_{eq} = R_1 + R_2 + R_3$
 $I_T = I_1 = I_2 = I_3$

$V_T = V_1 + V_2 + V_3$ Skill 43-Series Circuits

157. The diagram below shows a circuit with three resistors.

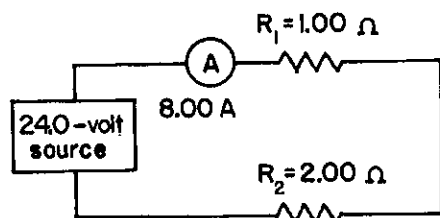


What is the resistance of resistor R_3 ?

- A) 6.0 Ω B) 2.0 Ω
 C) 12 Ω D) 4.0 Ω

	V	I	R
R_1			4 Ω
R_2			6 Ω
R_3			12 Ω
Totals	24 V	2 A	12 Ω

158. Base your answer to the following question on the diagram below.



What is the total resistance of the circuit?

- A) 0.500 Ω B) 2.00 Ω
 C) 3.00 Ω D) 4.00 Ω

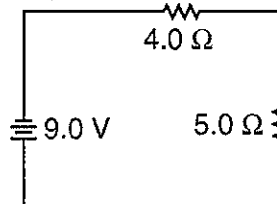
$R_{eq} = R_1 + R_2$

159. A 2.0-ohm resistor and a 4.0-ohm resistor are connected in series with a 12-volt battery. If the current through the 2.0-ohm resistor is 2.0 amperes, the current through the 4.0-ohm resistor is

- A) 1.0 A B) 2.0 A
 C) 3.0 A D) 4.0 A

$I_T = I_1 = I_2$

160. A 9.0-volt battery is connected to a 4.0-ohm resistor and a 5.0-ohm resistor as shown in the diagram below.



What is the current in the 5.0-ohm resistor?

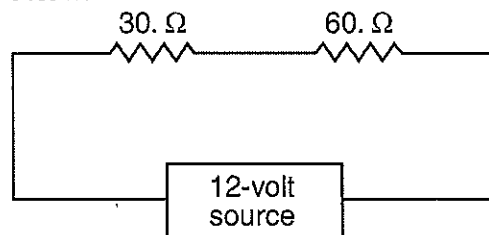
- A) 1.0 A B) 2.3 A
 C) 1.8 A D) 4.0 A

$R_{eq} = R_1 + R_2 = 4 \Omega + 5 \Omega$
 $I = \frac{V}{R} = \frac{9V}{9\Omega} = 1A$

161. A 10.-ohm resistor and a 20.-ohm resistor are connected in series to a voltage source. When the current through the 10.-ohm resistor is 2.0 amperes, what is the current through the 20.-ohm resistor?

- A) 1.0 A B) 2.0 A
 C) 0.50 A D) 4.0 A

162. A 30.-ohm resistor and a 60.-ohm resistor are connected in an electric circuit as shown below.

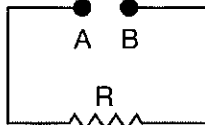


Compared to the electric current through the 30.-ohm resistor, the electric current through the 60.-ohm resistor is

- A) smaller B) larger
 C) the same

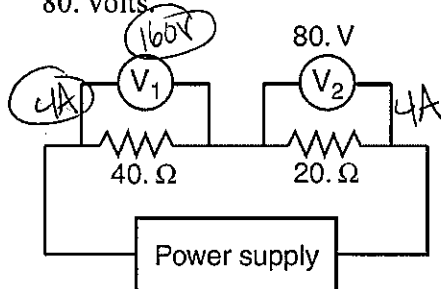
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163. What must be inserted between points *A* and *B* to establish a steady electric current in the incomplete circuit represented in the diagram below?



- A) switch
B) voltmeter
C) magnetic field source
D) source of potential difference
ie a battery

164. In the circuit shown below, voltmeter V_2 reads 80. volts

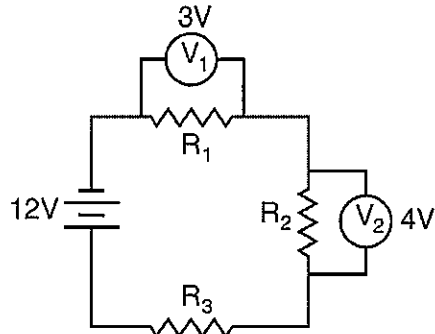


What is the reading of voltmeter V_1 ?

- A) 160 V
B) 80. V
C) 40. V
D) 20. V

	V	I	R
R_1	160V	4A	40Ω
R_2	80V	4A	20Ω
	240V	4A	60Ω

165. The diagram below shows three resistors, R_1 , R_2 , and R_3 , connected to a 12-volt battery.



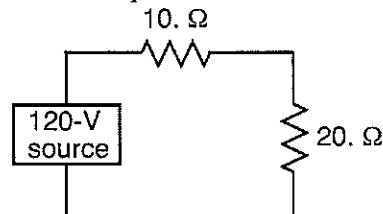
If voltmeter V_1 reads 3 volts and voltmeter V_2 reads 4 volts, what is the potential drop across resistor R_3 ?

- A) 12 V
B) 5 V
C) 0 V
D) 4 V

$$V_T = V_1 + V_2 + V_3$$

$$12V = 3V + 4V + V_3$$

166. The diagram below represents a circuit consisting of two resistors connected to a source of potential difference.



What is the current through the 20.-ohm resistor?

- A) 0.25 A
B) 6.0 A
C) 12 A
D) 4.0 A

$$I = \frac{V}{R} = \frac{120V}{30\Omega} = 4A$$

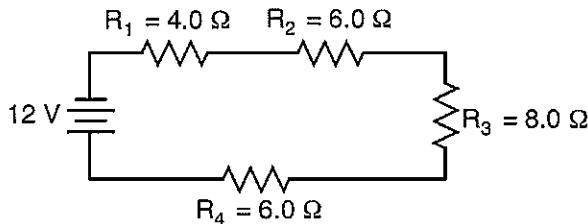
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167. Circuit A has four 3.0-ohm resistors connected in series with a 24-volt battery, and circuit B has two 3.0-ohm resistors connected in series with a 24-volt battery. Compared to the total potential drop across circuit A, the total potential drop across circuit B is

- A) one-half as great
B) twice as great
C) the same
D) four times as great

A	B
3Ω, 3Ω	3Ω, 3Ω
3Ω, 3Ω	= 6Ω
Req = 12Ω	
24V	24V

168. The circuit diagram below represents four resistors connected to a 12-volt source.



What is the total current in the circuit?

- A) 0.50 A
B) 2.0 A
C) 8.6 A
D) 24 A

$$R_{eq} = 4\Omega + 6\Omega + 8\Omega + 6\Omega = 24\Omega$$

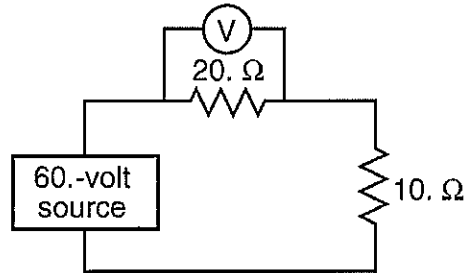
$$I = \frac{V}{R} = \frac{12V}{24\Omega} = .5A$$

169. A 3.0-ohm resistor and a 6.0-ohm resistor are connected in series in an operating electric circuit. If the current through the 3.0-ohm resistor is 4.0 amperes, what is the potential difference across the 6.0-ohm resistor?

- A) 8.0 V
B) 2.0 V
C) 12 V
D) 24 V

V	I	R
12V	4A	3Ω
24V	4A	6Ω
36V	4A	9Ω

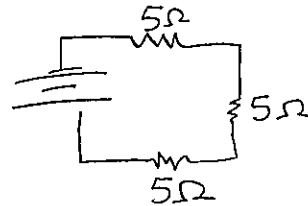
170. In the circuit represented by the diagram below, what is the reading of voltmeter V?



- A) 20. V
B) 2.0 V
C) 30. V
D) 40. V

V	I	R
40V	2A	20Ω
20V	2A	10Ω
60V	2A	30Ω

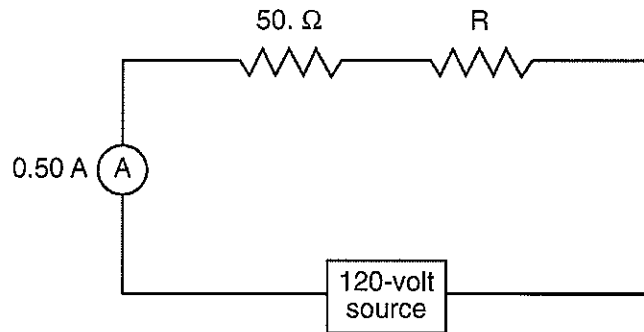
171. An electric circuit contains a source of potential difference and 5-ohm resistors that combine to give the circuit an equivalent resistance of 15 ohms. Draw a diagram of this circuit using circuit symbols given in the *Reference Tables for Physical Setting/Physics*. [Assume the availability of any number of 5-ohm resistors and wires of negligible resistance.]



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Base your answers to questions 172 through 174 on the information and diagram below.

A 50.-ohm resistor, an unknown resistor R , a 120-volt source, and an ammeter are connected in a complete circuit. The ammeter reads 0.50 ampere.



	V	I	R	P
R_1	25V	.5A	50 Ω	12.5W
R_2	95V	.5A	190 Ω	47.5W
R_{eq}	120V	.5A	240 Ω	60W

$R_2 = \frac{V_2}{I_2} = \frac{95V}{.5A} = 190\Omega$

172. Calculate the power dissipated by the 50.-ohm resistor. [Show all work, including the equation and substitution with units.] 12.5W

173. Determine the resistance of resistor R .

190 Ω

174. Calculate the equivalent resistance of the circuit. [Show all work, including the equation and substitution with units.]

$$R_{eq} = R_1 + R_2$$

$$R_{eq} = 50\Omega + 190\Omega = 240\Omega$$