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

\[
R \triangleq \frac{V}{I} \Rightarrow R_T = \frac{120V}{0.5A} \Rightarrow R_T = 240 \Omega
\]

5) Determine the resistance of resistor \( R \) shown in the diagram.

\[
R = 190 \Omega
\]

Questions 6 through 8 refer to the following:

A 3.0-ohm resistor, an unknown resistor, \( R \), and two ammeters, \( A_1 \) and \( A_2 \), are connected as shown below with a 12-volt source. Ammeter \( A_2 \) reads a current of 5.0 amperes.

6) Determine the equivalent resistance of the circuit shown.

\[
\frac{1}{R_T} = \frac{1}{3} + \frac{1}{12} \Rightarrow R_T = 12 \Omega
\]

7) Calculate the current measured by ammeter \( A_1 \) in the diagram shown. [Show all work, including the equation and substitution with units.]

\[
I = \frac{V}{R} \Rightarrow I = \frac{12V}{3 \Omega} \Rightarrow I = \text{parallel} \Rightarrow I = 4 \text{ amps}
\]

8) Calculate the resistance of the unknown resistor, \( R \) in the diagram shown. [Show all work, including the equation and substitution with units.]

Since total going back = total going in
5 amps back = 5 amps going to resistors
4 amps through 3.2 resistor and 1 amp through \( R \) parallel

\[
R = \frac{V}{I} \Rightarrow R = \frac{12V}{1 \text{ amp}} \Rightarrow R = 12 \Omega
\]
Series and Parallel Circuits Worksheet

Questions 1 and 2 refer to the following:

The diagram below represents an electric circuit consisting of four resistors and a 12-volt battery.

1) What is the current measured by ammeter A shown in the diagram?
   \[ I = \frac{12 \text{ V}}{6 \Omega} \]
   \[ I = 2 \text{ amps} \]

2) What is the equivalent resistance of the circuit shown?
   \[ \frac{1}{R_T} = \frac{1}{6} + \frac{1}{12} + \frac{1}{18} + \frac{1}{36} \]
   \[ \frac{1}{R_T} = \frac{6 + 3 + 2 + 1}{36} \]
   \[ R_T = \frac{12}{36} = \frac{1}{3} \]

3) A 6.0-ohm lamp requires 0.25 ampere of current to operate. In which circuit below would the lamp operate correctly when switch S is closed?

   A) 1.5 V
   B) 1.5 V
   C) 1.5 V
   D) 1.5 V

Questions 4 and 5 refer to the following:

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.

The current remains the same.

\[ I = \frac{V}{R_{\text{total}}} \]

\[ 0.50 \text{ A} \cdot 50 \Omega = 240 \Omega \]

\[ R = 190 \Omega \]

Remember:

\[ R_{\text{total}} = R_1 + R_2 + R_3 \]

\[ 240 = 50 + R \]

\[ 190 \Omega = R \]