Example:
Consider the circuit shown in Figure 1. Find the value of the resistance $R$.

![Figure 1: The circuit considered in this example.](image)

Solution: The terminals in Figure 1 divide the circuit into two parts, the part to the left of the terminals and the part to the right of the terminals. The part to the left of the terminals consists of four resistors. The 9 Ω resistor, the 10 Ω resistor and the 17 Ω resistor are connected in series. That series combination of resistors is, in turn, connected in parallel with resistor labeled $R$. These four resistors could be replaced by a single equivalent resistor. The Ohmmeter measures the resistance of that equivalent resistor.

The resistance of the equivalent resistor is given by

$$R_{eq} = (9 + 10 + 17) \parallel R = \frac{(9+10+17)R}{(9+10+17)+R} = \frac{(36)R}{(36)+R}$$

The Ohmmeter in Figure 1 measures the value of the equivalent resistance to be 24 Ω. Therefore

$$\frac{(36)R}{(36)+R} = 24 \implies 36R = 24R + (24)(36)$$

$$\implies 12R = (24)(36)$$

Solving this equation gives $R = 72$ Ω.