

When no source is attached (open-circuited terminals), the voltage across the terminals has the form ***A*sin** (4***t*** + φ).

1. What will the terminal current be when you replace the source by a short circuit?
2. If you were to build a circuit that was identical (from the viewpoint of the terminals) to the given one, what would your circuit be?
3. For your circuit, what are A and φ?

**Figure 3.72 Black-Box Circuit**

When you attach a voltage source equaling sin (t) to the terminals, the current through the source equals

You are given a circuit ([Figure 3.72](#_bookmark204)) that has two terminals for

attaching circuit elements.

**Problem 3.30: Black-Box Circuit**



1. What voltage should he measure when he attaches nothing to the mystery circuit?
2. What voltage should Sammy measure if he doubled the size of the

capacitor to 2 F and attached it to the circuit?

Sammy must determine as much as he can about a mystery circuit by attaching elements to the terminal and measuring the resulting voltage. When he attaches a 1Ω resistor to the circuit's terminals, he measures the voltage across the terminals to be 3sin (t). When he

attaches a 1F capacitor across the terminals, the voltage is now

**Problem 3.31: Solving a Mystery Circuit**