Each electrical circuit in the figure has a voltmeter connected. The voltage across the resistor will vary sinusoidally over time, which affects the current flowing through the circuit. The voltage across the capacitor will also vary sinusoidally over time, but it will lag behind the voltage across the resistor by 90 degrees due to the phase difference. The waveform of the voltage across the inductor and the resistor will be the same, but the amplitude will be reduced due to the inductive reactance.
The current through a circuit is given by
\[ I = \frac{V}{R} \]
where \( V \) is the voltage and \( R \) is the resistance.

For a simple RC circuit,
\[ V = L \frac{dI}{dt} + IR \]
where \( L \) is the inductance, \( C \) is the capacitance, and \( R \) is the resistance.

We can use phasors to consider these

\[ \text{phasor diagram} \]

- For a current of 0.5 A, the phasor diagram shows
- For a voltage of 12 V, the phasor diagram shows
- For a capacitive reactance of 8 \( \Omega \), the phasor diagram shows