

Electrical Formula Cheat Sheet

For planning and learning only. Electrical work can be dangerous and is regulated: follow your local electrical code (e.g. NEC in the US, BS 7671 in the UK) and use a licensed electrician where required.

Ohm's law

$$V = I \times R \cdot I = V \div R \cdot R = V \div I.$$

Power

$P = V \times I$. Example: a 1,800 W heater on 120 V draws 15 A; on 230 V it draws about 7.8 A.

Continuous loads

Under the NEC, continuous loads (3+ hours) are commonly limited to 80% of the breaker rating, e.g. 16 A on a 20 A breaker.

Voltage drop

A common design target is 3% or less on a branch circuit. Longer runs and higher current need thicker wire.

Before you start

Turn off the breaker, verify dead with a tester, and label every circuit in the panel.

Your worksheet

Circuit	Load (W)	Amps	Wire / breaker

Free calculators that go with this pack: Wire size calculator (<https://wiremath.pages.dev/wire-size-calculator/>) · Voltage drop calculator (<https://wiremath.pages.dev/voltage-drop-calculator/>) · Ohm's law calculator (<https://wiremath.pages.dev/ohms-law-calculator/>) · Breaker size calculator (<https://wiremath.pages.dev/breaker-size-calculator/>)
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