

Calculating Resistor values

To Calculate Mechanical advantage you need to:

This is a very simple question to work out, you simply divide the Output by the input and the answer should be a whole number.



MATHEMATICAL UNDERSTANDING

To calculate resistor values in series you simply add up the value of each individual resistor.

Total resistance in series = $R1 + R2 + R3 \dots$

Question

If $R1$ is $1\text{ k}\Omega$, $R2$ is $10\text{ k}\Omega$ and $R3$ is 100Ω , what would be the total resistance?

Solution

$1000 + 10000 + 100 = 11100\Omega = 11.1\text{ k}\Omega$

Calculating Resistor values

Using the equation: Total Resistance = $R1 + R2 + R3$

1 Calculate the Total resistance if $R1 = 1\text{k}$ $R2 = 10\text{K}$ and $R3 = 100$ (show all working)

2, Calculate the Total resistance if $R1 = 2\text{k}$ $R2 = 5\text{K}$ and $R3 = 200$ (show all working)

3, Calculate the Total resistance if $R1 = 1.5\text{k}$ $R2 = 2.5\text{K}$ and $R3 = 250$ (show all working)

4, Calculate the Total resistance if $R1 = 1.2\text{k}$ $R2 = 10.2\text{K}$ and $R3 = 750$ (show all working)

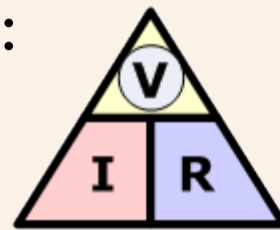
5, Calculate the Total resistance if $R1 = 2.1\text{k}$ $R2 = 1\text{M}$ and $R3 = 950$ (show all working)

Calculating Gear Ohm's law

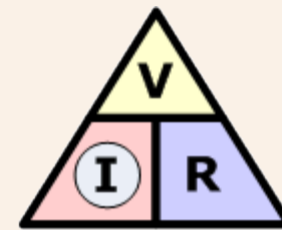
To calculate Ohm's law you need to:

Use the equation: $V = I \times R$

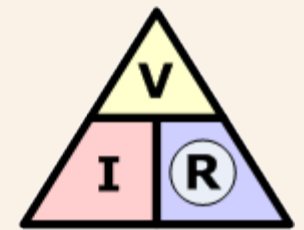
And be able to rework the equation



$$V = I \times R$$



$$I = \frac{V}{R}$$



$$R = \frac{V}{I}$$

You basically cover up the letter you are looking for and then if the letters are next to each other you multiply and if they are above each other you divide.

MATHEMATICAL UNDERSTANDING

E12: Ohm's law

The required value of a protective resistor for an LED can be calculated using Ohm's Law.

Question

An LED requires 20 mA (0.02 A) to light and has a voltage drop of 2V across it. If the supply voltage is 9V, what is the required protective resistor value?

Solution

$$V = I \times R$$

$$\text{So, } R = \frac{V}{I}$$

$$V = 9 - 2 = 7$$

$$R = \frac{7}{0.02}$$

$$R = 350 \Omega$$

As this is an unusual value for a resistor, a 330 Ω resistor could be used instead.



Calculating Ohm's law

- 1, An LED requires 20mA (0.02A) to light and has a voltage drop of 2V across it. If the supply voltage is 9V, what is the required protective resistor value?
- 2, An LED requires 40mA (0.04A) to light and has a voltage drop of 3V across it. If the supply voltage is 9V, what is the required protective resistor value?
- 3, An LED requires 50mA (0.05A) to light and has a voltage drop of 3V across it. If the supply voltage is 12V, what is the required protective resistor value?
- 4, Calculate the voltage if the circuit uses 330 ohms resistors and has a Current of 60mA (0.06A)
- 5, Calculate the Current (in mA) if the circuit uses a 220 ohms resistor and has a voltage of 9V.