Engineering Maths First Aid Kit

The modulus of a number

Introduction

In many engineering calculations you will come across the symbol $|\ |$. This is known as the **modulus**.

1. The modulus of a number

The modulus of a number is its absolute size. That is, we disregard any sign it might have.

Example

The modulus of -8 is simply 8.

The modulus of $-\frac{1}{2}$ is $\frac{1}{2}$.

The modulus of 17 is simply 17.

The modulus of 0 is 0.

So, the modulus of a positive number is simply the number.

The modulus of a negative number is found by ignoring the minus sign.

The modulus of a number is denoted by writing vertical lines around the number.

Note also that the modulus of a negative number can be found by multiplying it by -1 since, for example, $-(-8) = 8$.

This observation allows us to define the modulus of a number quite concisely in the following way

$$|x| = \begin{cases} x & \text{if } x \text{ is positive or zero} \\ -x & \text{if } x \text{ is negative} \end{cases}$$

Example

$$|9| = 9, \qquad |-11| = 11, \qquad |0.25| = 0.25, \qquad |-3.7| = 3.7$$

Exercise

1. Draw up a table of values of $|x|$ as x varies between -6 and 6. Plot a graph of $y = |x|$. Compare your graph with the graphs of $y = x$ and $y = -x$.