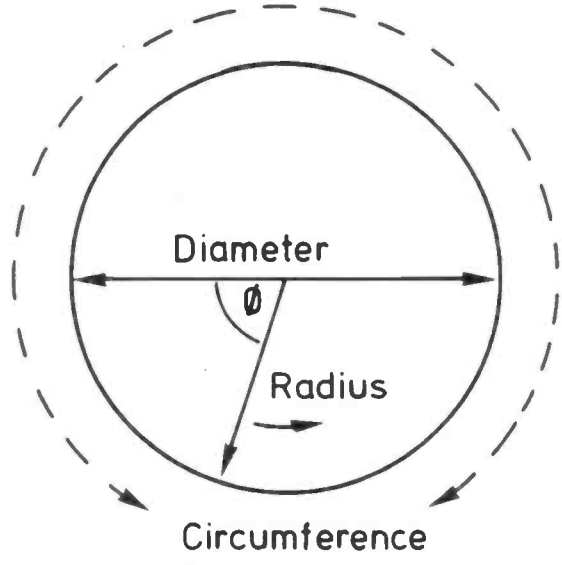
Radio Maths Made Simple

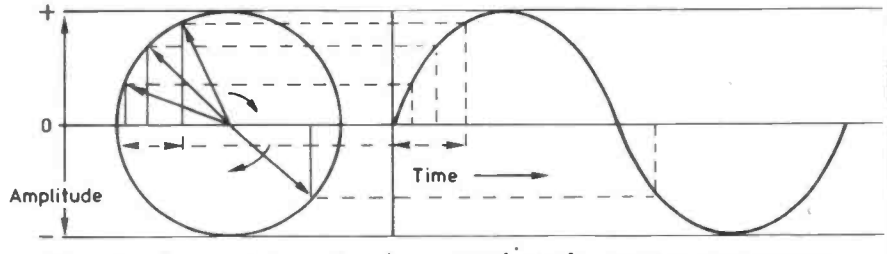
Basic Maths for RAE Students by Bill Sparks G8FBX

Part 3. Ohm's Law



Circumference = π x Diameter = 3.142 x dia.
Diameter = 2 x Radius (R)
So Circ = 2 π R
ϕ is angle radius subtends at centre

Using above to illustrate formation of sine wave. As can be seen, angle ϕ varies from 0-360° during rotation of radius through one revolution.



Showing how rotation of radius round circle creates sine waves, when rotating on a constant time rate. Notice when radius is in top half of circle net effect is forward movement. ie positive direction. When radius moves to bottom half net effect is reverse direction ie negative direction so top half of cycle is positive, bottom is negative.

Continuing from the August article, this technique is used in Ohm's Law calculations since **V = I × R** where **V** is any voltage we may find. **I** is the corresponding current and **R** is the value of resistor that makes the equation come out to the correct answer. Variations on the above give **V/R = I** and **V/I = R** so we can use the basic **V = I × R** formula to give values to **I** and **R**. We can therefore say if **V = I × R** then **I = V/R** and **R = V/I**.

This is the same as saying: if **a = b × c (a = bc)** then **b = c** and **c = b**. You will note that this is different to the original explanation and the difference is that originally we said that **ab = c**, now we are saying **bc = a**, we could have said **ac = b**. The actual letters in use are not important. The relationship of one side of the equation to the other is the important fact.

As a proof of the above, substitute numbers for letters.

If $a = 4$ $b = 8$ and $c = 2$

then $\frac{8}{4} = 2$ so $\frac{b}{a} = c$

According to the formula:

if $\frac{b}{a} = c$ then $b = ac$

or $\frac{8}{4} = 2$ then $8 = 4 \times 2$

This can be further amplified to another formula:

$$\frac{ab}{c} = d$$

In order to find **d** we carry out our calculation