

Solution of Quadratic Equations by Factorisation

The general quadratic equation $ax^2 + bx + c = 0$ has real-valued coefficients a, b, c and $a \neq 0$. There are a number of methods of solution¹ in the document the solution of quadratic equations by factorisation is explored.

If we can factorise a quadratic equation then the solution can be obtained as a direct result.

For example for the equation

$$x^2 + 3x + 2 = 0$$

we can write in the factorised form

$$(x + 1)(x + 2) = 0.$$

By reasoning that if the product of two factors is zero then one or the other factors must be zero, it follows that

$$(x + 1) = 0$$

OR

$$(x + 2) = 0$$

and hence that $x = -1$ or $x = -2$.

There is no simple method for the factorisation step. In the example,

$$x^2 + 3x + 2 = 0$$

we would look to factorise it as follows

$$x^2 + 3x + 2 = (x + p)(x + q).$$

Since

$$(x + p)(x + q) = x^2 + (p + q)x + pq$$

then we look for values of p and q with sum 3 and product 2.

However, a quadratic equation does not always have (real) factors and even when they do they may be difficult to factorise by sight. In the next section we will look at the forms of solution alongside considering graphical methods of solving quadratic equations.

¹ [Solution of Quadratic Equations](#)