

Synthetic division is a simplified way of dividing a polynomial by a linear factor to find its roots. It involves using the coefficients of the polynomial. A to D are the coefficients of the polynomial and r is the root.

Here is an example.

Is $x + 2$ a factor of $f(x) = x^3 + 5x^2 + 8x + 4$?

Also make sure you fully factorise.

Find the root by solving $x + 2 = 0$ by subtracting two from both sides resulting in a root of negative two.

Take the coefficients of the polynomial and the root and put in table form.

Bring the first coefficient down and multiply by the root negative two. Place the answer under the five and add together to get three.

Repeat this until all coefficients are used.

The last answer is commonly known as the remainder. The remainder here is zero, which means $x + 2$ is a factor of $f(x) = x^3 + 5x^2 + 8x + 4$.

Fully factorise by forming the quadratic $x^2 + 3x + 2$ taking the values from the bottom of the table.

So fully factorised the polynomial is $(x + 1)(x + 2)(x + 2)$.

Remember if asked to factorise fully, find all the factors using factorisation.

If a question asks you to solve, find all roots, set each bracket to zero and solve for x .