

Section 1: The general binomial expansion

Crucial points

1. **Be careful when working with fractions**

It is very easy to make mistakes when finding binomial expansions where n is a fraction, as the binomial coefficients can be quite complicated to work out. Write out the working carefully and check your work.

2. **Be careful with signs**

There are often several negative signs involved in each term of a binomial expansion. Use brackets if it helps to make your work clearer, and always check your work.

3. **Know how to deal with cases where the first term in the bracket is not 1**

To expand a function of the form $(a+x)^n$ for $a \neq 1$ when n is not a positive integer, take out a factor to give $a^n \left(1 + \frac{x}{a}\right)^n$. Remember that when you have expanded $\left(1 + \frac{x}{a}\right)^n$ you must then multiply by a^n .

4. **Make sure that you know the validity of your expansion**

Remember that $(1+x)^n$ where n is not a positive integer is valid only for $-1 < x < 1$, and $(1+ax)^n$ is valid only for $-\frac{1}{a} < x < \frac{1}{a}$.