



Expanding two binomial expressions

Learning Skills

Introduction:

In algebra you may be required to expand or multiply together two binomial expressions.

This sheet will teach you to:

- Identify a binomial
- Multiply two binomials

1. What is a binomial expression

A binomial is an algebraic expression with a plus or minus separating two unlike terms. Some examples are $4x+3$ and x^2-4x .

2. Expanding two binomials

To multiply two binomial expressions the distributive law is used:

1. Split the first binomial up into its two terms
2. Multiply each term with the second **complete** binomial. Often this yields some like terms that can be collected.

Example

Expand $(x+5)(x-3)$

$$\begin{aligned}
 &= x(x-3) + 5(x-3) \\
 &= x \times x - 3 \times x + 5 \times x - 5 \times 3 \\
 &= x^2 - 3x + 5x - 15 \\
 &= x^2 + 2x - 15
 \end{aligned}$$

Note

-3x and +5x are like terms that can be added

Example

Expand $(4x-2)(3x-7)$

$$\begin{aligned} &= 4x(3x-7) - 2(3x-7) \\ &= 4x \times 3x - 4x \times 7 - 2 \times 3x - 2 \times (-7) \\ &= 12x^2 - 28x - 6x + 14 \\ &= 12x^2 - 34x + 14 \end{aligned}$$

Note

Care needs to be taken when multiplying by negative terms

Some students may have learnt the FOIL method – first terms, outer terms, inner terms and last terms. The foil method can be used to expand binomial however an advantage of the distributive method is that expressions of any size can be expanded.

For example $(2x^3 - 4x + 5)(x^2 + 6x - 3)$ can be expanded by the distributive method to yield an answer of $2x^5 + 12x^4 - 10x^3 - 19x^2 + 42x - 15$.

3. For more information

Visit our Learning Skills website at <http://www.csu.edu.au/division/studserv/maths/index.htm>

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