



Removing brackets 2

Introduction

In this leaflet we show the correct procedure for writing expressions of the form (a + b)(c + d)in an alternative form without brackets.

1. Expressions of the form (a+b)(c+d)

In the expression (a + b)(c + d) it is intended that each term in the first bracket multiplies each term in the second.

(a+b)(c+d) = ac + bc + ad + bd

Example

Removing the brackets from (5+a)(2+b) gives

 $5 \times 2 + a \times 2 + 5 \times b + a \times b$

which simplifies to

10 + 2a + 5b + ab

Example

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Removing the brackets from (x+6)(x+2) gives

 $x \times x + 6 \times x + x \times 2 + 6 \times 2$

which equals

 $x^2 + 6x + 2x + 12$

which simplifies to

 $x^2 + 8x + 12$

Example

Removing the brackets from (x+7)(x-3) gives

 $x \times x + 7 \times x + x \times -3 + 7 \times -3$

which equals

 $x^2 + 7x - 3x - 21$

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which simplifies to

$$x^2 + 4x - 21$$

Example

Removing the brackets from (2x+3)(x+4) gives

 $2x \times x + 3 \times x + 2x \times 4 + 3 \times 4$

which equals

 $2x^2 + 3x + 8x + 12$

which simplifies to

 $2x^2 + 11x + 12$

Occasionally you will need to square a bracketed expression. This can lead to errors. Study the following example.

Example

Remove the brackets from $(x+1)^2$.

Solution

You need to be clear that when a quantity is squared it is multiplied by itself. So

 $(x+1)^2$ means (x+1)(x+1)

Then removing the brackets gives

 $x \times x + 1 \times x + x \times 1 + 1 \times 1$

which equals

 $x^2 + x + x + 1$

which simplifies to

 $x^2 + 2x + 1$

Note that $(x + 1)^2$ is not equal to $x^2 + 1$, and more generally $(x + y)^2$ is not equal to $x^2 + y^2$.

Exercises

Remove the brackets from each of the following expressions simplifying your answers where appropriate.

1. a) (x+2)(x+3), b) (x-4)(x+1), c) $(x-1)^2$, d) (3x+1)(2x-4). 2. a) (2x-7)(x-1), b) (x+5)(3x-1), c) $(2x+1)^2$, d) $(x-3)^2$.

Answers

1. a) $x^2 + 5x + 6$, b) $x^2 - 3x - 4$, c) $x^2 - 2x + 1$, d) $6x^2 - 10x - 4$. 2. a) $2x^2 - 9x + 7$, b) $3x^2 + 14x - 5$, c) $4x^2 + 4x + 1$, d) $x^2 - 6x + 9$.

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