

Removing Brackets & Simplifying

SINGLE BRACKETS: $a \times (b + c) = a \times b + a \times c$

Multiply everything inside the brackets by the number/letter outside the brackets.

$$(1) \quad 3p(2p + r) \\ = \quad 6p^2 + 3pr$$

$$(2) \quad 2a(3a - b + 5) \\ = \quad 6a^2 - 2ab + 10a$$

Be careful when multiplying by a negative:

$$(3) \quad -3(2w - 3y) \\ = \quad -6w + 9y$$

$$(4) \quad -n(4n + 5m) \\ = \quad -4n^2 - 5mn$$

EXPRESSIONS: remove brackets then simplify

Remember to tidy up similar terms.

no sign change

$$(1) \quad 2a + 3a(2 - 3a) \\ = \quad 2a + 6a - 9a^2 \\ = \quad 8a - 9a^2$$

sign change

$$(2) \quad 5 - 3(2a - 3) \\ = \quad 5 - 6a + 9 \\ = \quad 14 - 6a$$

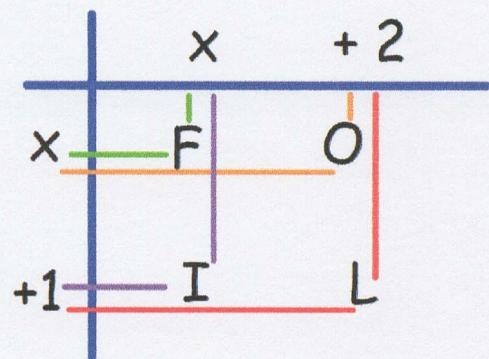
The $2a$ term is not involved in the process of removing the brackets!

Multiplying out Double Brackets

To multiply out double brackets

$$\text{e.g. } (x + 1)(x + 2)$$

We use FOIL (in a box)
 Firsts Outsides Insides Lasts



Examples

$$(1) \quad (2x + 5)(2x - 3)$$

$$= 4x^2 - \underline{6x} + 10x - 15$$

Gather like terms

$$= 4x^2 + 4x - 15$$

	2x	- 3
2x	4x ²	- 6x
+5	+ 10x	- 15

$$(2) \quad (2x - 3)^2$$

$$= (2x - 3)(2x - 3)$$

$$= 4x^2 - \underline{6x} - \underline{6x} + 9$$

Gather like terms

$$= 4x^2 - 12x + 9$$

When squaring brackets
follow the same process.

	2x	- 3
2x	4x ²	- 6x
- 3	- 6x	+ 9

(3) Same process for trinomials:

$$(2x - 3)(3x^2 - 2x + 5)$$

$$= 6x^3 - \underline{4x^2} + \underline{10x} - \underline{9x^2} + \underline{6x} - 15$$

Gather like terms

$$= \underline{6x^3 - 13x^2 + 16x - 15}$$

Add a column

	3x ²	- 2x	+ 5
2x	6x ³	- 4x ²	+ 10x
- 3	- 9x ²	+ 6x	- 15