

# 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.

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

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

Be careful when multiplying by a negative:

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

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

EXPRESSIONS: remove brackets then simplify

Remember to tidy up similar terms.

no sign change

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

sign change

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

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



# Multiplying out Double Brackets

To multiply out double brackets

e.g.  $(x + 1)(x + 2)$

We use FOIL (in a box)

Firsts      Outsides      Insides      Lasts

Examples

	$x$	$+ 2$
$x$	F	O
$+1$	I	L

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

$= 4x^2 - 6x + 10x - 15$

Gather like terms

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

	$2x$	$- 3$
$2x$	$4x^2$	$- 6x$
$+5$	$+ 10x$	$- 15$

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

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

$= 4x^2 - 6x - 6x + 9$

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:

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

$= 6x^3 - 4x^2 + 10x - 9x^2 + 6x - 15$

Gather like terms

$= 6x^3 - 13x^2 + 16x - 15$

Add a column

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