

Expanding brackets



Expanding or multiplying out brackets is a key algebra skill.

You have to multiply the expression outside the bracket by everything inside the bracket.

$$4n \times n^2 = 4n^3$$

$$4n(n^2 + 2) = 4n^3 + 8n$$

$$4n \times 2 = 8n$$

'Expand and simplify' means 'multiply out and then collect like terms'.

Golden rule

When you expand, you need to be careful with negative signs in front of the bracket.

Negative signs belong to the term to their right.

$$x - 2(x - y) = x - 2 \times x + 2 \times y$$

$$= -x + 2y$$

Multiply out the brackets first and then collect like terms if possible.

You can use the GRID METHOD to expand two brackets.

$$(x + 7)(x - 5) = x^2 - 5x + 7x - 35$$

$$= x^2 + 2x - 35$$

Remember to collect like terms if possible.

	x	-5
x	x^2	$-5x$
7	$7x$	-35

The negative sign belongs to the 5. You need to write it in your grid.

OR

You can use the acronym FOIL to expand two brackets.

$$(2a + b)(a - b) = 2a^2 - 2ab + ab - b^2$$

$$= 2a^2 - ab - b^2$$

First terms
Outer terms
Inner terms
Last terms

Some people remember this as a 'smiley face'.

Worked example

Expand and simplify $(3p - 4)^2$

$$(3p - 4)^2 = (3p - 4)(3p - 4)$$

$$= 9p^2 - 12p - 12p + 16$$

$$= 9p^2 - 24p + 16$$

	$3p$	-4
$3p$	$9p^2$	$-12p$
-4	$-12p$	16

The question is 'expand and simplify' so you have to multiply out and collect like terms. Use the grid method or FOIL to find all four terms of the expansion.

Be extra careful with your negative signs.
 $-4 \times -4 = 16$ $p \times -4 = -4p$

Now try this

1. (a) Expand $7(5 - 2x)$ (1 mark)

(b) Expand and simplify $8(3x + 4) - 2(4x - 5)$ (2 marks)

(c) Expand and simplify $(y - 3)(y + 4)$ (2 marks)

2. Expand and simplify $(x - 3)(2x + 5)$ (2 marks)

3. (a) Expand and simplify $(x - 5y)(2x + 3y)$ (2 marks)

(b) Expand and simplify $(x + 6)^2 - (x - 7)^2$ (3 marks)

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