

Expanding brackets

Expanding is to remove brackets from an algebraic expression.

FOIL is called the Distributive Law: $(a+b)(c+d) = ac+ad+bc+bd$

Expansions

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

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

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

4) $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

5) $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

First Terms $\longrightarrow (2x+3)(x-2) = 2x(x) = 2x^2$

Outer Terms $\longrightarrow (2x+3)(x-2) = 2x(-2) = -4x$

Inside Terms $\longrightarrow (2x+3)(x-2) = 3(x) = 3x$

Last Terms $\longrightarrow (2x+3)(x-2) = 3(-2) = -6$



FOIL

This results in:

$2x^2 - 4x + 3x - 6$

Combine like terms: $(-4x + 3x = -x)$

$2x^2 - x - 6$ This is the final answer.

Expand

$2(y + 3) \quad 2y + 6$

Factor

For example :

factoring $2y + 6$

both $2y$ and 6 have a common factor of 2

$2y$ is $2 \times y$

6 is 2×3

So you can factor the whole expression into: $2y+6 = 2(y+3)$

Find the product $(m - 1)(-4m - 4)$

To simplify the product of two binomials, use the distributive property.

Use the **FOIL** method. Find the products of the **F**irst, **O**utside, **I**nside, and **L**ast terms, and then add them.

Use the distributive property to simplify $(m - 1)(-4m - 4)$. You can use the FOIL method:

Multiply the first terms of $(m - 1)(-4m - 4)$: $(m)(-4m) = -4m^2$

Multiply the outside terms of $(m - 1)(-4m - 4)$: $(m)(-4) = -4m$

Multiply the inside terms of $(m - 1)(-4m - 4)$: $(-1)(-4m) = 4m$

Multiply the last terms of $(m - 1)(-4m - 4)$: $(-1)(-4) = 4$

Finally, add these results and simplify.

$-4m^2 + -4m + 4m + 4$

$-4m^2 + 4$

DISTRIBUTIVE PROPERTIES

The Distributive Properties rules tell us that if you have a term being multiplied by two or more terms being either added or subtracted within brackets (parenthesis), the term outside the brackets must be multiplied by EVERY term within the brackets.

$$\mathbf{a(b + c) = ab + ac}$$

$$\mathbf{(b + c)a = ba + ca}$$

Example: Use the distributive property to rewrite $2(x - y)$ without parenthesis.

$$\begin{aligned} &2(x - y) \\ &= 2(x) - 2(y) && \text{distribute 2 to every term within the} \\ & && \text{brackets} \\ &= 2x - 2y \end{aligned}$$

Example: Use the distributive property to rewrite $-(5x + 3y)$ without parenthesis.

$$\begin{aligned} &-(5x + 3y) \\ &= (-1)(5x) + (-1)(3y) && \text{distribute -1 to every term within the} \\ & && \text{brackets} \\ &= -5x - 3y \end{aligned}$$

Example: Simplify the expression $3(5a - 10)$

$$\begin{aligned} &3(5a - 10) \\ &= 3(5a) - 3(10) && \text{distribute 3 to every term within the} \\ & && \text{brackets} \\ &= 15a - 30 \end{aligned}$$

Example: Simplify the expression $4(3 + 25x) - 10(2x + 3y^2)$

$$\begin{aligned} &4(3 + 25x) - 10(2x + 3y^2) \\ &= 4(3) + 4(25x) - 10(2x) - 10(3y^2) \\ &= 12 + 100x - 20x - 30y^2 \\ &= -30y^2 + 80x + 12 \end{aligned}$$

STUDENT LEARNING CENTRE
REGISTRY BUILDING ANNEXE

TEL: 61-8-8201 2518
E-MAIL: slc@flinders.edu.au

INTERNET: <http://www.flinders.edu.au/SLC>
POSTAL: PO BOX 2100, ADELAIDE, SA 5001