

The distributive law

The distributive law tells us how to deal with a product where one of the factors is a sum in brackets

$$a(b + c) = ab + ac$$

There is an invisible multiplication symbol between the first factor and the bracket. Each term in the bracket gets multiplied by the factor out the front of the bracket. We say multiplication 'distributes' over addition, or that we are 'expanding the brackets'.

Examples

- 1) $4(3 + 2x) = 12 + 8x$
- 2) $-2(3 - 2n) = -6 + 4n$
- 3) $10(2x^2 + 5x - 3) = 20x^2 + 50x - 30$
- 4) $-(6a - b + c - 4d) = -6a + b - c + 4d$

Exercises

Expand the following:

- | | |
|-----------------|-----------------------------|
| a) $2(a + x)$ | g) $-9(-a - b)$ |
| b) $5(2 - b)$ | h) $7(3 + x + 2y)$ |
| c) $3(-x - y)$ | i) $10(2 - a^2 + b^2 - ab)$ |
| d) $-6(5 + m)$ | j) $2x(3x + 2x^2 - x^5)$ |
| e) $-4(7 - c)$ | |
| f) $-(-8a + 1)$ | |

Answers

- | | |
|---------------|--------------------------------|
| a) $2a + 2x$ | g) $9a + 9b$ |
| b) $10 - 5b$ | h) $21 + 7x + 14y$ |
| c) $-3x - 3y$ | i) $20 - 10a^2 + 10b^2 - 10ab$ |
| d) $-30 - 6m$ | j) $6x^2 + 4x^3 - 2x^6$ |
| e) $-28 + 4c$ | |
| f) $8a - 1$ | |