Revision topic: Expanding brackets

Objectives:

◇ Revise how to expand brackets

Key points:

Expanding brackets is everywhere in maths, so getting good at it so you don't make mistakes is vital. The good news is that it's not a difficult topic if you can remember to be systematic.

Here's a basic example: Expand $3(x - 4)$.

What this means is actually $3 \times (x - 4)$ but **we normally omit multiplication signs on the front of brackets**. Practically it means you need to multiply by 3 the result you get by *first* calculating $x - 4$.

However, to expand the bracket we mean to remove the brackets from the expression entirely and to do this we have to **distribute** the 3 over the brackets. Just a fancy phrase to say that the number on the outside is separately multiplied by every *element* inside. *Elements* are terms separated by $+$ or $-$ signs.

In this case we multiply the 3 by each of the terms labelled with a blue arrow separately and then combine the answers.

$$3(x - 4) = 3(\overset{\downarrow}{x} - \overset{\downarrow}{4}) = 3 \times \overset{\downarrow}{x} - 3 \times \overset{\downarrow}{4} = 3x - 12.$$

Notice that when the elements are re-combined at the end the negative signs need to be re-used.

When multiplying two brackets every element from one bracket is separately multiplied by every element from the other bracket. So every red arrow element is individually multiplied by every blue arrow element here: (there are a total of 4 combinations here)

$$(\overset{\downarrow}{x} - \overset{\downarrow}{7})(\overset{\downarrow}{a} - \overset{\downarrow}{b}) = x \times a - x \times b - 7 \times a - -7 \times b = xa - xb - 7a + 7b$$

Remember, two negative signs make a positive sign, hence $- - 7b \to +7b$.

Recommended links:

Highly recommended: Mathcentre notes on expanding brackets

Other links: Khan academy on distributive property, also Khan academy on distributive property with variables