Expansion of Two Brackets

Starter

1. **(Review of last lesson)**
Expand and simplify: (a) $2(8x-7)+5(4-9x)$ (b) $6(3x-10)-(11x-3)$

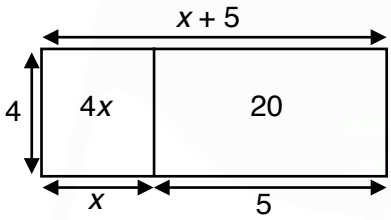
2.* What do you think the answer would be if we expanded these brackets?
(a) $(a+b)(c+d)$ (b) $(x+2)(x+3)$
N.B. See below for the explanation.

Notes

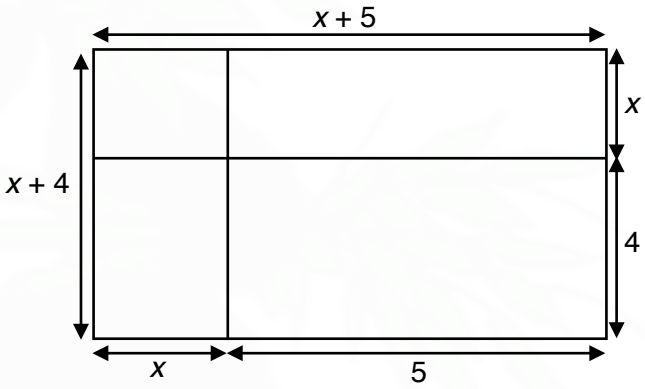
Below we have the equivalent diagrams for expanding single and double brackets.

E.g. 1 (a) Copy the diagrams.
(b) By comparing diagram A with diagram B, fill in expressions or numbers for the 4 areas of diagram B.
(c) Hence write down the expansion of $(x+4)(x+5)$.
(d) Collect any terms from your answer to (b).

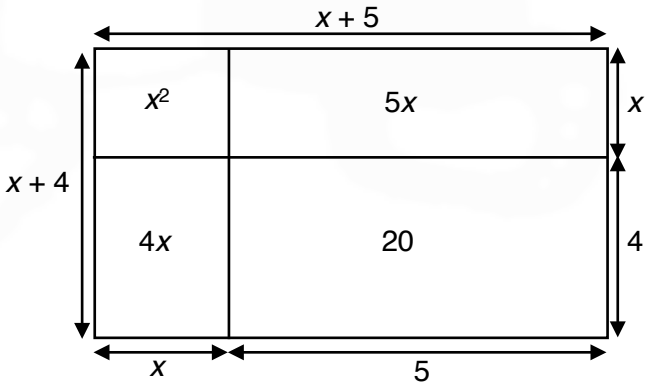
A. Expansion of $4(x+5)$



B. Expansion of $(x+4)(x+5)$



Working: (b)



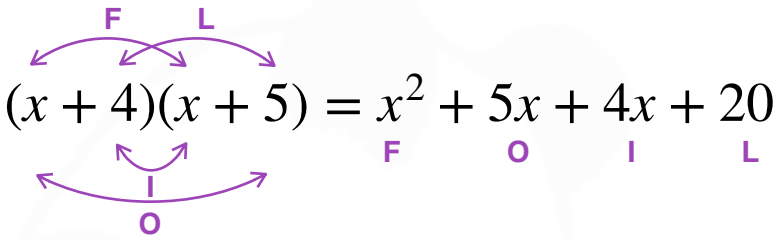
(c) $(x+4)(x+5)=x^2+5x+4x+20$

(d) $(x+4)(x+5)=x^2+9x+20$

In short, when expanding double brackets, every term in the first bracket multiplies every term in the second bracket.

It is too time-consuming to draw diagrams for each question so we use the mnemonic **FOIL**.

First = multiply the ***first*** terms in each bracket
Outside = multiply the ***outside*** terms in each bracket
Inside = multiply the ***inside*** terms in each bracket
Last = multiply the ***last*** terms in each bracket



E.g. 2 Expand and simplify: (a) $(x+3)(x+7)$ (b) $(2n+3)(n+5)$
(c) $(n+4)(n-2)$ (d) $(2x+1)(3x+7)$

Working: (a) $(x+3)(x+7) = x^2 + 7x + 3x + 21 = x^2 + 10x + 21$

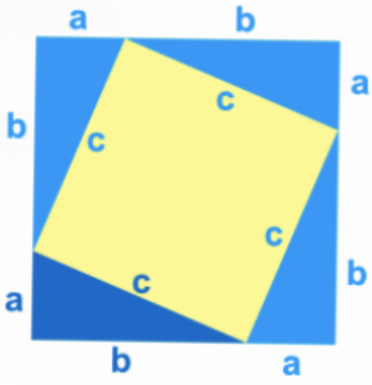
E.g. 3 Expand and simplify: (a) $(x+5)^2$ (b) $(x-3)^2$ (c) $(3x-7)^2$

Working: (a)
$$\begin{aligned}(x+5)^2 &= (x+5)(x+5)\\ &= x^2 + 5x + 5x + 25\\ &= x^2 + 10x + 25\end{aligned}$$

E.g. 4 Expand and simplify: (a) $(x+8)(x-8)$ (b) $(4x-9)(4x+9)$

Working: (a) $(x+8)(x-8) = x^2 - 8x + 8x - 64 = x^2 - 64$

E.g. 5 Use the following diagram to prove Pythagoras Theorem.



Video: Expanding 2 brackets

Solutions to Starter and E.g.s

Exercise
p139 Ex 8.4 Qu 2ace, 3ac, 4-6, 7ace, 8ace, 9, 10ace, 11*

Summary

First = multiply the ***first*** terms in each bracket
Outside = multiply the ***outside*** terms in each bracket
Inside = multiply the ***inside*** terms in each bracket
Last = multiply the ***last*** terms in each bracket

Textbook answers (only available during a lockdown)