Expansion of Two Brackets

Starter

1. **(Review of last lesson)**

Expand and simplify: (a) $2(8x-7)+5(4-9x)$ (b) $6(3x-10)-(11x-3)$

Working: (a) $2(8x-7)+5(4-9x)=16x-14+20-45x=6-29x$

(b) $6(3x-10)-(11x-3)=18x-60-11x+3=7x-57$

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.

Working: (a) $(a+b)(c+d)=ab+ad+bc+bd$

(b) $(x+2)(x+3)=x^2+2x+3x+6=x^2+5x+6$

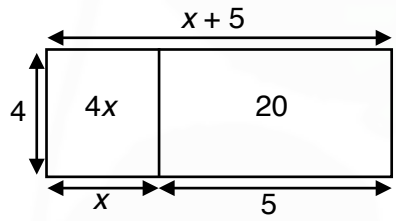
E.g. 1 (a) Copy the diagrams.

(b) By comparing diagram A with diagram B, fill in expressions or numbers for the 4 areas of diagram B.

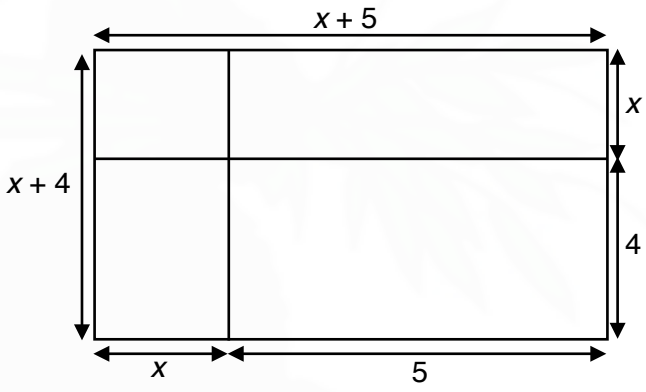
(c) Hence write down the expansion of $(x+4)(x+5)$.

(d) Collect any terms from your answer to (b).

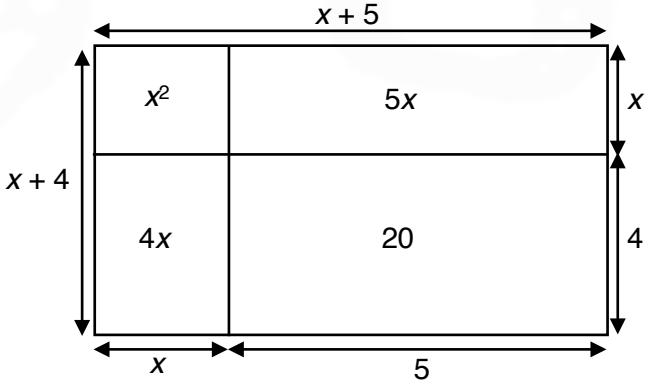
A. Expansion of $4(x+5)$



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



Working: (b)



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

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

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

(b) $(2n+3)(n+5) = 2n^2+10n+3n+15 = 2n^2+13n+15$

(c) $(n+4)(n-2) = n^2-2n+4n-8 = n^2+2n-8$

(d) $(2x+1)(3x+7) = 6x^2+14x+3x+7 = 6x^2+17x+7$

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

Working: (a) $(x+5)^2 = (x+5)(x+5)$
$= x^2+5x+5x+25$
$= x^2+10x+25$

(b) $(x-3)^2 = (x-3)(x-3)$
$= x^2-3x-3x+9$
$= x^2-6x+9$

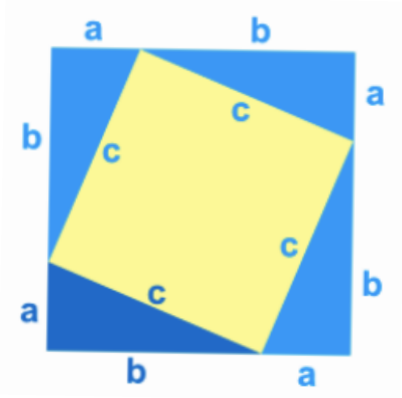
(c) $(3x-7)^2 = (3x-7)(3x-7)$
$= 9x^2-21x-21x+49$
$= 9x^2-42x+49$

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

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

(b) $(4x-9)(4x+9) = 16x^2+36x-36x-81 = 16x^2-81$

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



Working:

Area of big square $= (a+b)^2$
$= (a+b)(a+b)$
$= a^2 + 2ab + b^2$

Area of yellow square $= c^2$

Area of each triangle $= \dfrac{a \times b}{2}$

Area of the 4 triangles $= 4 \times \dfrac{ab}{2}$
$= 2ab$

Area of big square = Area of yellow square + Area of 4 triangles

$a^2 + 2ab + b^2 = c^2 + 2ab$

Cancelling $2ab$ from both sides gives Pythagoras' Theorem: $a^2 + b^2 = c^2$

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*

Textbook answers (only available during a lockdown)