Expanding double brackets

A LEVEL LINKS
Scheme of work: 1a. Algebraic expressions – basic algebraic manipulation, indices and surds

Example 1   Expand and simplify $(x + 3)(x + 2)$

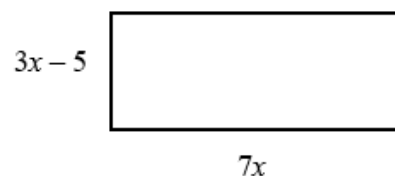|	
$(x + 3)(x + 2)$ $= x(x + 2) + 3(x + 2)$ $= x^2 + 2x + 3x + 6$ $= x^2 + 5x + 6$	**1** Expand the brackets by multiplying $(x + 2)$ by x and $(x + 2)$ by 3 **2** Simplify by collecting like terms: $2x + 3x = 5x$

Example 2   Expand and simplify $(x - 5)(2x + 3)$

$(x - 5)(2x + 3)$ $= x(2x + 3) - 5(2x + 3)$ $= 2x^2 + 3x - 10x - 15$ $= 2x^2 - 7x - 15$	**1** Expand the brackets by multiplying $(2x + 3)$ by x and $(2x + 3)$ by -5 **2** Simplify by collecting like terms: $3x - 10x = -7x$

Practice questions

1   The diagram shows a rectangle.
Write down an expression, in terms of x, for the area of the rectangle.
Show that the area of the rectangle can be written as $21x^2 - 35x$

2   Expand and simplify.

    a $(x + 4)(x + 5)$ **b** $(x + 7)(x + 3)$

    c $(x + 7)(x - 2)$ **d** $(x + 5)(x - 5)$

    e $(2x + 3)(x - 1)$ **f** $(3x - 2)(2x + 1)$

    g $(5x - 3)(2x - 5)$ **h** $(3x - 2)(7 + 4x)$

    i $(3x + 4y)(5y + 6x)$ **j** $(x + 5)^2$

    k $(2x - 7)^2$ **l** $(4x - 3y)^2$

3   Expand and simplify $(x + 3)^2 + (x - 4)^2$

4   Expand and simplify.

    a $\left(x + \dfrac{1}{x}\right)\left(x - \dfrac{2}{x}\right)$ **b** $\left(x + \dfrac{1}{x}\right)^2$

Answers

1 $7x(3x - 5) = 21x^2 - 35x$

2   **a** $x^2 + 9x + 20$ **b** $x^2 + 10x + 21$

      c $x^2 + 5x - 14$ **d** $x^2 - 25$

      e $2x^2 + x - 3$ **f** $6x^2 - x - 2$

      g $10x^2 - 31x + 15$ **h** $12x^2 + 13x - 14$

      i $18x^2 + 39xy + 20y^2$ **j** $x^2 + 10x + 25$

      k $4x^2 - 28x + 49$ **l** $16x^2 - 24xy + 9y^2$

3 $2x^2 - 2x + 25$

4   **a** $x^2 - 1 - \dfrac{2}{x^2}$ **b** $x^2 + 2 + \dfrac{1}{x^2}$