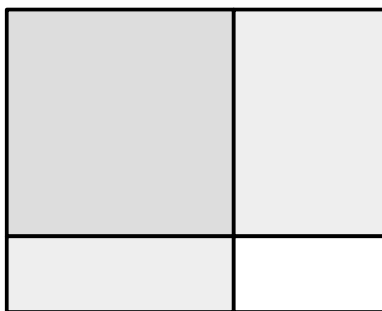


Worksheet 11: Algebra Part 3

Give yourself plenty of space to answer these questions, don't scrunch the answers up in the margin of the handout!

Gateway skills for this session

- 1) Work out -4×5
- 2) Work out -8×-5
- 3) Simplify $x^2 - 3x + 5x - 15$ as far as you can
- 4) Simplify $x^2 + 9xy + 4yx + 36$ as far as you can
- 5) Multiply out $-6(x-5)$
- 6) Work out $1\,760 \times 0$
- 7) Write down 0×14.875
- 8) Two different numbers A and B give zero when you multiply them together: in symbols $A \times B = 0$.
What statements can you make about the values of A and B?
- 9) A rectangle is made from four smaller rectangles as shown below



- a) Can you write an *expression* for the perimeter of the rectangle?
- b) Can you write an *expression* for the area of the rectangle?
Hint: find an expression for the area of each of the small rectangles and then add those together and simplify

Multiplying out pairs of brackets (quadratics)

Check the negative multiplications!

Use separate paper and use plenty of space!

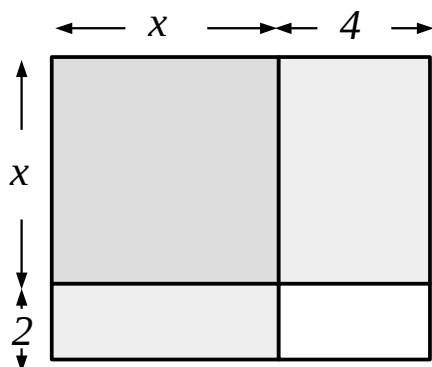
- 1) Multiply out $x(x + 1)$
- 2) Multiply out $3(x + 1)$
- 3) Multiply out $(x + 3)(x + 1)$
- 4) Expand $(x + 3)(x - 1)$
- 5) Multiply out $(x - 3)(x + 1)$
- 6) Expand $(x - 3)(x - 1)$
- 7) Look at your answers to questions 3, 4, 5 and 6 above.
Make a note of the signs of the constant term in each case
Notice how the x terms add up sometimes and subtract sometimes?
- 8) Expand and simplify $4(x - 3) - x(x - 3)$
- 9) Multiply out $(x + 5)(x + 6)$
- 10) Expand $(x + 4)(x - 7)$
- 11) Multiply out $(x - 9)(x - 3)$
- 12) Expand $(x + 7)(x - 6)$
- 13) Multiply out $(x - 4)(x + 3)$
- 14) Expand $(5 - x)(2 - x)$
- 15) Expand $(x + 3)(x - 3)$
- 16) $(x - 3)(x + 7) \equiv ax^2 + bx + c$
Find the values of a , b and c
- 17) $(x - 1)(x + 2) = 0$
Find the two values of x that make this true
- 18) Multiply out $(3x - 4)(2x + 3)$
- 19) $(x - 4)(x + d) = x^2 - x - 12$. Work out the value of d

Factorise quadratics

Complete the table below...

	Quadratic	Factorised into brackets
1	$x^2 + 2x + 1$	
2	$x^2 - 2x + 1$	
3	$x^2 - x - 6$	
4	$x^2 + x - 6$	
5	$x^2 + 5x - 6$	
6	$x^2 - 5x - 6$	
7	$x^2 - 4x + 4$	
8	$x^2 - 4$	
9	$x^2 - 14x + 13$	
10	$x^2 + 12x - 13$	

- 11) a) Factorise $x^2 + 3x + 2$
 b) Write down both solutions to the equation $x^2 + 3x + 2 = 0$
- 12) a) Factorise $x^2 - x - 2$
 b) Write down both solutions to the equation $x^2 - x - 2 = 0$
- 13) (*) Factorise $x^2 - 16$
- 14) (**) The total area of the four rectangles below is 63 cm^2 .
 Work out the value of x .



Identities and equations

Each line of the table below contains two expressions

Some are identities, so $A \equiv B$ for *all* values of the variable

Some are equations, so $A = B$ for *some* specific values of the variable

Decide which sign to use for each of the lines in the table...

	Expression A	"=" or " \equiv "	Expression B
1	$3(4x + 1)$		$12x + 3$
2	$4x + 1$		21
3	$25x^2 - 16$		$(5x + 4)(5x - 4)$
4	$L + W + L + W$		$2(L + W)$
5	$4(2x + 5) + 3(x + 2)$		$11x + 26$
6	$(y + 3)^2$		$y^2 + 6y + 9$
7	$3x + 5$		$7x - 3$
8	$81 - M^2$		$(9 + M)(9 - M)$
9	$x^2 + 6x + 8$		$(x + 2)(x + 4)$
10	$\frac{a}{3} + \frac{a}{5}$		$\frac{8a}{15}$

For each of the lines that is an equation, solve the equation.

For each of the lines that is an identity, show that the identity is valid by transforming one expression into the other.