Subject	Year	Month	
Mathematics	9	Oct/Nov	Balcarras *From strength to strength*

Topic:

EXPANDING AND FACTORISING QUADRATICS

6 LESSONS

Content (Intent)

Prior Learning

Y7
- Intro to algebra
- collecting like terms
- Know that $x \times x = x^2$
- **Expand over a simple single bracket**
- Perimeter and area of 2D shapes

Y8
- Algebraic notation
- Index law
- Factorising a two-term expression

Future Learning

- Solving quadratic equations, with x^2 coefficient >1
- Quadratic formula
- Completing the square

Objectives

- Multiply two linear expressions of the form (x+a)(x+b)
- Multiply two linear expressions of the form (ax±b)(cx±d)
- Expand the expression $(x±a)^2$
- <mark>HIGHER</mark>: three binomials

- Factorise a quadratic expression of the form $x^2 +bx$
- Factorise a quadratic expression of the form $x^2 + bx + c$

- Create an expression or a formula to describe a situation (link algebra to worded questions and geometrical shapes)
- Solve questions worded "Show that / prove that …" e.g. Algebraic expression of the area to a compound shape.
- <mark>HIGHER</mark> Solve volume/surface area questions with algebraic dimensions and a given formula.

For teaching purposes
Possible Questions

- The answer is $x^2 + 10x + c$. Show me a possible question. And another
- Convince me that (x + 3)(x + 4) does not equal $x^2 + 7$.
- What is wrong with this statement? (x + 3)(x + 4) $\equiv x^2 + 12x + 7$.
- Jenny thinks that $(x - 2)^2 = x^2 - 4$. Do you agree with Jenny? Explain your answer.

Possible Misconceptions

- After factorising a quadratic expression, students might overcomplicate the simpler case of factorising an expression
- may think that $(x+ a)^2 \equiv x^2 + a^2$
- may think that, for example, -2 × -3 = -6
- may think that $x^2 + 12 + 7x$ is not equivalent to $x^2 + 7x + 12$, and therefore think that they are wrong if the answer is given as $x^2 + 7x + 12$

Pedagogical notes (implementation)

Students should be taught to use the equivalency symbol '≡' when working with identities.

During this unit students could construct (and solve) equations in addition to expressions and formulae.

Common approaches
the grid method → Can be used in reverse for factorising
FOIL method → Factorising will require "two values that multiply to be … and add up to be …"

How will understanding be assessed & recorded (Impact)

9BAM3 Manipulating expressions I
9BAM4 Manipulating expressions II
End of Term assessment in December
Exams in May

How can parents help at home?

MathsWatch clips (Qualification GCSE)
134b, 178, 175 (only first half), 192

Further reading/discussion

Reading / Enrichment
NCETM: Algebra
NCETM: Departmental workshops: Deriving and Rearranging Formulae
NCETM: Glossary
KM: Stick on the Maths: Multiplying linear expressions
KM: Maths to Infinity: Brackets
KM: Maths to Infinity: Quadratics
NRICH: Pair Products
NRICH: Multiplication Square
NRICH: Why 24?

Literacy
Inequality
Identity
Equivalent
Equation
Formula, Formulae
Expression
Expand
Linear
Quadratic

Numeracy Links

Careers Links
Engineer
Computing engineer