Subject	Year	Month	
Mathematics	9	March	Balcarras From strength to strength

Topic:

SIMULTANEOUS EQUATIONS — 4 LESSONS

Content (Intent)

Prior Learning

Y7
- Solve linear equations
- Expanding brackets

Y8
- Solve linear equations (with unknown on both sides)
- Plotting graphs of functions of the form y=mx+c

Y9
- Solve inequalities
- Straight line and quadratic graphs
-

Future Learning

- Solving algebraically simultaneously a linear equation and a quadratic equation
- Understand that tangents give repeated roots
- Understand that the value of the discriminant of the derived quadratic equation is linked to how the graphs intersect

Objectives

- Understand that there are an infinite number of solutions to the equation $ax + by = c$ ($a \neq 0$, $b \neq 0$)
- Read solutions or estimate from graphs (links nicely with previous topic)
  - ✓ 2 straight line graphs
  - ✓ 1 straight line combined with a quadratic
- Solve two linear simultaneous equations in two variables
  - ✓ addition - no multiplication required
  - ✓ subtraction - no multiplication required
  - ✓ mixed addition or subtraction - no multiplication required
  - ✓ multiplication of **one equation** required
  - ✓ multiplication of **both equations** required

Derive and solve two simultaneous equations from worded problems

For teaching purposes

Possible questions
- Show me a solution to the equation $5a + b = 32$. And another.
- Show me a pair of simultaneous equations with the solution $x = 2$ and $y = -5$. And another.
- Kenny and Jenny are solving the simultaneous equations $x + 4y = 7$ and $x – 2y = 1$. Kenny thinks the equations should be added. Jenny thinks they should be subtracted. Who do you agree with? Explain why.

Possible Misconceptions
- may not multiply all coefficients, or the constant
- may think that it is always right to eliminate the first variable
- may struggle to deal with negative numbers correctly

Pedagogical notes (implementation)

Common approaches
Students are taught to label the equations (1) and (2), and label the subsequent equation (3)
Teachers use graphs (i.e. dynamic software) to demonstrate solutions to simultaneous equations at every opportunity

How will understanding be assessed & recorded (Impact)

9BAM11 Simultaneous equations
Exams in May

How can parents help at home?

MathsWatch clips
Qualification GCSE : 140, 162, 211
Qualification KS3: A24a, A24b, A26a, A26b, A26c

Further reading/discussion

Reading / Enrichment

KM: Stick on the Maths ALG2: Simultaneous linear equations

NRICH: What's it worth?

NRICH: Warmsnug Double Glazing

NRICH: Arithmagons

Literacy

Equation
Simultaneous equation
Variable
Manipulate
Eliminate
Solve
Derive
Interpret

Numeracy Links

Careers Links

Engineers
Air Traffic Control
Road Designers
Aircraft Designers
Computer programmers