Mental maths and algebra

Teacher guidance

**Overview of task**

Students are presented with a calculation ‘trick’ – a method for working out the squares of two-digit numbers. They then use algebra to explore the reasons why the method works.

**Strands:** Number; Algebra

**Prior knowledge**

Students should have basic GCSE-level understanding of algebraic manipulation. This task provides an opportunity to probe and develop their ability to relate algebraic formulations to patterns in calculations.

**Relevance to Core Maths qualifications**

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| --- | --- | --- | --- | --- |
| **AQA** | **C&G** | **Eduqas** | **Pearson/ Edexcel** | **OCR** |
| ✓ | ✓ | ✓ | ✓ | ✓ |

**Suggested approaches**

This task is suitable for work in pairs, perhaps as a starter for a longer session on algebraic manipulation (e.g. the difference of two squares).

**Resources/documentation**

Use either the supplied PowerPoint or the ‘middle’ part of following video clip (from about 2.00 minutes to 6.00 minutes) to introduce the ‘trick’ for squaring numbers:

<https://www.youtube.com/watch?v=1JW9BA57aR8>

Then ask students to give a convincing explanation of why the method works. You may want to prompt them to ‘use algebra’, or leave this for the students to decide; it may be useful to compare other types of ‘proofs’ (e.g. verbal and pictorial) to algebraic methods.

**Relevant digital technologies**

Apart from the clip indicated above, there are many other video resources available on the Internet that demonstrate (and in some cases explain) mental mathematical tricks and shortcuts.

**Possible extensions**

Explore other methods for mental maths: for example, using algebra to justify the method for multiplying by 11 shown at the start of the video above, or explaining why the ‘standard’ divisibility tests for 3, 7 and 9 work.

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Developed by Ihsan Eltom of Fareham College.