Steve Wren - Written Evidence (NUM0043)

Top-line summary

The central argument of this submission is that GCSE mathematics, as currently designed and incentivised, cannot guarantee that pupils achieving a grade 4 are genuinely numerate. Structural features of assessment and accountability drive curriculum decisions in ways that prioritise breadth, procedural exposure and exam technique over secure numeracy. We have, however, been here before. It is important that we learn lessons from the failures of those intended solutions.

1. About me

1. I am submitting evidence in an individual capacity. My views draw on evidence gathered across a 25-year career in mathematics education, inspection, curriculum design and national policy.
2. I worked as a mathematics teacher and second in department for five years, followed by six years as Head of Mathematics in an 11–16 secondary school.
3. I spent three years as a part-time county mathematics adviser, including organising and leading termly conferences for Heads of Mathematics.
4. I served for ten years as a secondary senior leader with responsibility for curriculum, teaching and learning, and raising achievement. My final leadership post was Director of KS3/Head of lower school.
5. I was an HMI and Ofsted's National Lead for Mathematics for almost six years. I co-led the collation and evaluation of Ofsted's evidence base on the effectiveness of mathematics education in English schools, drawing on hundreds of inspections and national research. I developed and delivered national inspector training on the features of effective maths education, ensuring consistency and subject-specific rigour in inspection practice. I was instrumental in developing the evidence-gathering methodology for, and authoring, Ofsted's 2024 mathematics subject report *Co-ordinating Mathematical Success* — Ofsted's first national mathematics subject report in over 15 years. I spoke at more than 40 mathematics conferences, including Maths Hubs, local authority events and

subject association national conferences, and represented Ofsted in mathematics discussions with DfE, Ofqual, the Royal Society, the Joint Council for Mathematics Education (JMC) and others.

6. Alongside this, I spent 18 months as a specialist adviser in Ofsted's policy team, focusing on the use of published data in inspection. I developed and delivered national training for inspectors on the appropriate interpretation and use of data, and worked closely with policy colleagues to ensure data was used proportionately and diagnostically on inspection and within the organisation.

7. I undertook a six-month secondment to Ofqual during the Covid period as a team leader developing policy for grading qualifications in summer 2021 in the situation where some students were able to sit exams, but others were not. I worked closely with officials at the DfE, Joint Qualifications Council, awarding body representatives, headteacher union leaders and others to formulate draft policy (the 'reserve papers' solution) and presented findings to Ofqual's leadership team and Covid recovery group.

8. I am currently Director of Yorkshire Educational Excellence, providing consultancy to schools and trusts on mathematics and wider curriculum, speaking at national events, supporting awarding bodies on qualification design, and writing opinion pieces for *Schools Week*. I also work part-time as Executive Director of Quality and Standards in a multi-academy trust.

9. This submission has been prepared with editing support from AI. I take full responsibility for its content.

2. What is numeracy?

10. There is no universally agreed definition of numeracy. However, organisations such as National Numeracy describe it as the ability to interpret data, statistics, charts and diagrams; process information; solve problems; check answers and make decisions based on logical thinking and reasoning. These elements reflect the practical application of mathematical thinking in everyday life.

11. Numeracy is therefore best understood as the confident and appropriate use of mathematical understanding in real-world contexts. It includes proportional reasoning, estimation, interpreting data, financial decision-making and the ability to evaluate risk. Numeracy is not a diluted form of mathematics; it is the practical expression of mathematical thinking in everyday life.

12. Secure numeracy requires strong foundations in number sense, confidence in interpreting and analysing data, and the ability to reason logically about quantitative relationships. It involves recognising patterns, making justified inferences, and applying structured thinking to unfamiliar situations. Numeracy develops cumulatively: gaps in early reasoning or data understanding undermine later learning and limit adult capability.

3. Why many pupils leave school without the numeracy they need

Weak early foundations create long-term difficulties

13. The foundations of strong numeracy are laid in the early years and Key Stage 1. When pupils do not secure early number sense, additive reasoning, and confidence interpreting simple quantitative information, these gaps compound over time. By secondary school, teachers are often trying to teach increasingly complex content to pupils whose underlying understanding is fragile.

Curriculum overload and the dominance of "coverage"

14. Evidence from Ofsted's mathematics subject report shows that the volume of curriculum content often drives school decision-making more strongly than the goal of secure pupil learning. The pressure to "get through the content" is reinforced by national assessments and accountability measures.

15. This creates a rational incentive for schools to move on when pupils struggle, rather than address underlying misconceptions. While this may maximise short-term test performance in national assessments (SATs and GCSEs) it leaves pupils with insecure knowledge that undermines later use.

The same structural issue persists at Key Stage 4

16. On the GCSE foundation tier, a score of around 50% is often sufficient for a grade 4 — the key accountability threshold. These very low boundaries mean pupils can accumulate enough marks across a broad paper without demonstrating secure numeracy. This creates strong incentives for teachers to move pupils through increasingly abstract content even when the basics are not secure. It is common to see pupils studying towards taking the foundation papers (covering grades 1–5) being taught trigonometry (including exact trigonometrical ratios without a calculator); Pythagoras' Theorem; set notation and plotting quadratic graphs when they

have insecure knowledge of the basics such as percentages, proportional reasoning (such as needed to 'scale' a recipe), estimation and interpreting data presented in charts/tables.

17. On the higher tier, as little as 16% can secure the crucial grade 4. This creates strong incentives for teachers to enter grade 4 pupils for foundation tier and move pupils through increasingly abstract content even when the basics are not secure. The very low boundaries on the higher tier papers mean pupils can accumulate enough marks across a broad paper without demonstrating secure numeracy.

18. The low grade boundaries, particularly at higher tier, incentivise teachers to "cut their losses" and move on without ensuring pupils have secure understanding of the basics required to be numerate members of society.

19. The structure of the GCSE encourages breadth over depth and procedural exposure over secure understanding, meaning pupils can achieve a grade 4 — widely interpreted as evidence of being "wholly numerate" — without genuinely being numerate.

20. Both the content selected and the way questions are constructed disproportionately drives curriculum prioritisation in secondary schools. Ofsted's subject report found that many schools design curriculums, and teachers plan backwards, from the demands of the GCSE papers, which means that teaching is shaped to meet the content and style of exam questions. If the system wants to shift the focus of GCSE mathematics towards secure numeracy, proportional reasoning, interpretation and decision-making, then assessment design will be the key lever. Without changes to what is asked, and how it is asked, curriculum intentions will continue to be shaped by the existing exam structure rather than by the numeracy needs of young people.

21. As a regular speaker at maths conferences, both as Ofsted's national lead for maths and as an independent consultant, the most common question (by far) that I am asked by maths heads of departments is "which tier of entry do you suggest I enter our grade 4/5 students for in order to maximise their chances of passing maths?".

22. Because the most commonly achieved grades in GCSE maths are grades 4 and 5 — the 'overlap grades' between foundation and

higher tier — Ofsted found that this leads to leaders being put in positions where the decision that is right for pupil 'grade maximisation' is not the one that is right for maximising what pupils learn.

4. We have been here before: why previous numeracy qualifications failed

23. Concerns about the volume and nature of content in GCSE mathematics are longstanding. Over the past three decades, several alternative qualifications have been trialled or proposed (including linked-pair GCSE maths in the late 2000s), but none have solved the core problems: what do we want GCSE maths to be 'about'? What do we want a level 2 pass (grade 4 or above) to actually mean?

4.1 Functional Skills Mathematics

24. Functional Skills mathematics was originally designed to be a practical, applied numeracy qualification for young people and adults. Its intention was to focus on real-life problem-solving, interpretation of information, and the ability to apply mathematics in context.

25. Over time, the requirement for Functional Skills Level 2 to be aligned in accountability point score with GCSE mathematics has driven a steady convergence of curriculum and assessment between the courses. To justify equivalent performance measures, Functional Skills had to demonstrate comparable demand, which led to increased abstraction, more technical content, and assessments that look far closer to GCSE than the original, applied versions. As a result, Functional Skills and GCSE mathematics now have far more in common than was ever intended, and Functional Skills no longer provides a distinct route for developing or certifying essential numeracy.

26. This convergence has meant that Functional Skills no longer offers a genuinely different pathway for learners who need applied numeracy. Instead, it has become another procedural mathematics qualification, rather than the practical, context-driven alternative originally envisaged.

4.2 FSMQs (Free-Standing Mathematics Qualifications)

27. FSMQs were introduced as flexible mathematics qualifications at Levels 1–3 (Level 1 = equivalent to GCSE grades 1–3; Level 2 = grades 4–9; Level 3 = post-16) in around 2000. The FSMQs, usually around the size of half a GCSE, covered a wide range of topics including personal finance, data handling, algebra, shape and space. Some maths departments, including mine when I was Head of Maths, delivered some of these courses alongside GCSE maths.

28. FSMQs, however, did not count in accountability measures (nowadays such as Progress 8 or Attainment 8). As a result, most schools did not offer them, and uptake remained low.

29. Without widespread adoption, FSMQs lacked visibility and credibility with employers and the public. Over time, they declined — not because the concept was flawed, but because system incentives did not support their use.

4.3 The accountability paradox

30. For any numeracy qualification to succeed, the accountability framework must value it highly. If a qualification is not recognised within Progress 8 or Attainment 8, schools have little incentive to offer it, regardless of its educational merit. Conversely, when a qualification is included in accountability measures, it must meet size and difficulty requirements, which inevitably pushes it towards GCSE-style content. This tension has repeatedly undermined attempts to create a distinct, credible numeracy qualification.

31. If a qualification does not count in Progress 8 or Attainment 8, most schools will not offer it. For example, even today, it is not uncommon for schools to 'ban' the maths department from offering the Level 2 Certificate in Additional Maths or the remaining Level 3 FSMQ in Additional Maths because they do not count in accountability measures and instead push them to offer GCSE Statistics, which does (in the open basket).

32. This explains why previous attempts to create alternative numeracy qualifications have failed to gain traction. Any viable solution must therefore work within the existing GCSE structure rather than outside it.

5. A viable solution: reforming GCSE mathematics

33. GCSE mathematics is currently trying to do two fundamentally different jobs: preparing all pupils to be numerate, confident

members of society, and teaching increasingly abstract mathematics needed for progression to post-16 and beyond.

34. These dual purposes create structural tensions. The breadth and abstraction required for academic progression sit uneasily alongside the practical numeracy needed for everyday life. As a result, the GCSE does not reliably guarantee that pupils achieving a grade 4 are genuinely numerate. A grade 4 pupil may be securely numerate but lack more abstract knowledge, whereas another grade 4 student may lack numeracy but have a grasp of (some) more abstract mathematical knowledge.

5.1 Core Maths as a model for reform

35. A useful reference point for a reformed GCSE foundation tier is Level 3 Core Maths, which is explicitly designed to develop mathematical thinking for life, work and further study. Core Maths questions typically require students to interpret information, estimate, make assumptions, and justify decisions in realistic contexts.

36. Core Maths includes tasks such as Fermi estimation, where students make fast, approximate calculations to answer real-world questions by identifying relevant factors and combining rough estimates.

37. These examples illustrate the type of applied numeracy that adults need and that employers value: interpreting data, estimating, making decisions, and evaluating whether an answer is reasonable. They also demonstrate how a reformed GCSE foundation tier could adopt Core Maths-style question structures, while adjusting the content to Key Stage 4 difficulty expectations.

38. A reformed foundation tier (covering grades 1–4) with a suitably high grade boundary for the grade 4 could therefore retain the familiar GCSE qualification but shift towards assessment that rewards being numerate: present information in charts, tables or short scenarios; require estimation rather than exact calculation; ask pupils to justify assumptions; emphasise proportional reasoning, risk, error, and interpretation. These mirror the mathematical thinking required in level 3 Core Maths, but at an appropriate level for key stage 4 students.

39. A reintroduced intermediate tier (perhaps grades 3–7) would be a blend of numeracy and ‘easier’ abstract topics, and a reformed

higher tier paper would be a blend of numeracy and the existing full range of abstract topics.

40. This approach would ensure that schools and teachers ensured that pupils are numerate before moving onto more abstract topics and that a grade 4 genuinely reflects numeracy for life, not simply procedural competence or strategic mark-gathering.

41. The approach also has the benefit that it supports a coherent progression for pupils who gain a grade 4–6 at GCSE to post-16 mathematical study. Currently very few of these pupils progress to study maths-related courses post-16. It develops a natural pathway for continued study of mathematics with a numeracy rather than abstract slant: GCSE foundation/intermediate → level 2 Core Maths → workplace or further study, with consistent emphasis on reasoning, interpretation and decision-making.

Closing statement

Reforming GCSE mathematics is the single most powerful lever available for improving national numeracy. Unless qualification curriculums, assessment design and accountability incentives are realigned with the goal of secure numeracy, curriculum decisions in schools will continue to be shaped by the exam rather than by the needs of young people, employers or society.

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