Further thoughts on routes to improvement

1. **Challenge the tradition of ROTE learning** - teaching at ALL levels should aim
to develop students’ fluency AND enable them to understand and think for
themselves;

Much greater thought is needed at all levels on HOW fluency is acquired and the impact of
the dominant rote model on attitudes towards the subject. At all stages there needs to be a
greater emphasis on solving problems and engendering a sense of the neatness and
connectedness of mathematics. This should be used as a way of boosting fluency and
understanding by giving a greater sense of purpose and making the subject far more
simulating.

2. **Degree courses that build the CONFIDENCE of ALL students and extend
their understanding of school mathematics**;

For many students (particularly the ‘average’ student, who is likely to be the major source of
school teachers) a degree course in mathematics is a deadening and narrowing experience
which does little to boost their confidence in their mathematical powers, to enthuse them
about mathematics or give them a broad view of the subject (history, general reading). All the
observations one makes about schools and school teachers apply with equal force to
lecturers, although a much greater level of subject knowledge and mathematical confidence
might be expected. However, good teaching needs much more than that.

3. **Clarity about the knowledge and understanding expected of teachers both
on completion of initial teacher training and when in post.**

Such a specification must be more than a list of content, because it must embrace in some
way the understanding that is required and include pedagogy - how to develop fluency,
respective roles of mental, written and calculator/computer procedures, sources of
misunderstanding, misconceptions and how to approach them, reasons why different aspects
are important, links and connections. A useful starting point would be to draw up a set of key
problems at different levels of school mathematics (KS3, GCSE, A level) to illustrate
expectations, but NEITHER as a tick list of items to be covered in a superficial way NOR with any pretence that such a list can be exhaustive.

ITT and CPD are clearly of critical importance, but any increase in provision will be wasted if we are not clear what we are seeking to achieve and do not consider what means doing it are likely to be most effective. There are three big problems:

- Providing sufficient TIME for student teachers and teachers in post to engage in a sustained way - given the shortage of teachers paying for supply cover is not adequate.

Would it make better sense to pay teachers to attend courses outside normal school hours (24 hour Friday/Saturday courses, holiday courses)? Should teachers have a contractual obligation to spend 5 days a year in subject specific CPD? Should those training to teach on school based routes (GTP) have the same entitlement to sustained subject specific training outside the school environment as on a PGCE course (and that is far from adequate)?

- Knowing what form ITT and CPD should take in order to make a real impact - timing, frequency, content, pedagogy of the trainers.

How to provide sustained engagement over a number of years? Is one 3 day course more effective than three 1 day courses? How do we ensure that the trainers are adequate for the task? How do you adapt needs and forms of CPD to the individual? How do you encourage people to read more widely?

- Identifying priorities.

Would more be achieved by targeting, say, secondary heads of departments or teachers in their second year of teaching? More time for subject knowledge and subject specific pedagogy in ITT?

4. Fight for fewer but better ‘high stakes’ tests and ‘performance measures’ that emphasise ability to solve problems and require much higher grade thresholds;

Tests per se are not a problem, but their form, frequency and the weight placed on them have serious repercussions. Current policies force teachers to narrow their teaching and push students on to the next ‘level’ when they have in no sense mastered the level they are at,
much less achieved any deep understanding or ability to apply the ideas to solve problems. This leads to cumulative incompetence and a common wish to give up mathematics at the earliest possible moment.

*What would 'fewer but better' tests look like?*

*Can we suggest 'performance measures' that would have positive effects on the quality of mathematics teaching?*

*How do we convince politicians and the DfES that current assessment and accountability policies are destroying mathematics (and the whole of education)?*

5. **Challenge policies which encourage ACCELERATION at all levels - know less and know it well rather than cover much and master little.**

The arguments about ACCELERATION apply with equal force to the levels at which pupils are entered for Key Stage tests, as well as GCSE early entry, and they apply to ALL students, not just the very able ones.

*Can we extend the ACCELERATION argument and link it to the arguments about TESTS and PERFORMANCE MEASURES, because these such barriers to providing an environment in which teachers can operate in a sane way?*

To summarise:

- Clarity about subject knowledge and subject specific pedagogy for teachers.

- Time for teachers at all levels to engage in sustained CPD and sufficient subject knowledge input in ITT.

- Challenge to existing policies on testing, performance measures and acceleration.