



Pearson

Transcript for recorded event

Course title: Live webinar - GCSE (9-1) Mathematics Summer 2017 exams review

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Slide	Purpose of Slide	Additional Information
Slide 1	Welcome to Emporium Towers	<p>Darkness falls across the land and the midnight hour is close at hand. Welcome to Emporium Towers. You'll see a picture here of where we broadcast from, this is where we keep all the cabinets, this is where we hold our summer parties.</p> <p>My name's Graham Cumming and I'm subject adviser at Edexcel, and the next hour and a half or so is my take on the summer GCSE maths exams. I'm not an examiner, I don't see the papers before they happen, but I see them after they've happened, and my qualification I suppose to do this is many years of experience at Edexcel and the exam board and speaking to teachers and speaking to examiners before and after the summer exams, and really to share with you, as far as I can, what went well, what didn't go well, what sort of things we'll be looking at for the future of these examinations, and some things that we can pass onto you that may help you with your teaching and preparing students for the exams. No doubt there'll be a few horrors during the session, certainly one or two that I wanted to point out.</p> <p>What I'm going to do is look at some introductory data to start with on the examinations and then I'm going to just take a few topic areas and illustrate them with questions. I'm going to look at some questions which were perhaps unexpectedly difficult, I'm going to look at crossover questions, those that have appeared on both the higher and foundation tier and how you might use those when you're thinking about tier of entry. I'm going to have a look at some problem solving questions and think about what's different and what the approach has been, and then I'm going to finish off just looking at some of the tougher questions, those that were on the higher tier.</p> <p>I'm not sure that anyone has come out from this new specification covered in glory. I think the introduction has been very difficult, and when I say covered in glory the exception is certainly the teachers who have delivered it and the students who have studied for it. I think there has been an incredible amount of work that has gone on to try and catch up, learn what's new, bring students up to the new standards.</p> <p>I think as far as the introduction of this specification went, if I think of a little history, back in 2002 when we brought in the new GCSE with the data handling in, data handling didn't go very well, it got abolished in the end, it was a decision then from the regulator of the time to say that we wouldn't bring in any more maths qualifications or curriculum without a lot of piloting. There was a pilot of a double GCSE went for some years, nothing really came of that. Then there was a linked pair pilot which has only just finished and for which we learned a lot, and that was going to be the double GCSE, possibly the new maths, but that got ditched as well. And ministers change, regulators change, that promise seemed to get forgotten, we got a new curriculum which hadn't really been tested out. It's called the new, the big fat GCSE, so there was a lot more to it, there wasn't a lot of advice on how much extra time should be given to it, there wasn't any stipulation, it was for schools to decide, so that was all a bit vague really. There was a new grading system that hadn't been tested out, hadn't been modelled particularly, there was a new ramping being brought in to the papers to make them harder or to make them get harder faster. So that changed things up. All those things came at once to change things, so it left everyone,</p>

		<p>I mean it left us as the exam board just as much and our examiners, perhaps not knowing which way to go. It certainly left a lot of teachers unsure about what to do, and what the new standard was. We had the problems with the grade 4 and 5 along the way, what was going to be the pass grade, I think it was going to be 5 but it was going to be 4 at first, and then it turned into a good pass and a strong pass. In some ways I'm not sure that we still know quite what it is, it's being measured in different ways, schools are being measured on 5s but entry to FE and stipulations for resits is on 4, so that's still a bit confused.</p> <p>We had a late accreditation, which had to be done twice because there were questions over the standards of the specimen materials across different boards and in line with what was required, so that came through late. That led to us being late in being able to provide support materials and perhaps textbooks to schools. There wasn't any testing of boundaries, so no one has known what the grade boundaries are likely to be for these new specifications. That can be liberating in some ways, that, if students don't think about that they may concentrate on the maths that they're doing. But it led to a lot of worry about what tier to enter students for, because in a sense the boundaries are showing a standard if you've got a paper and you know how many marks you have to get for each grade, you've got a sense of where your students are. That hasn't been available in the lead up, so the teachers and students to be coping with all that, it's been a magnificent job and I do congratulate you for that.</p> <p>And I hope for the next few exams that we can do a lot more to support you now that we all kind of know a bit more of where we are. I think our examiners have done a very good job with a very difficult brief. They've been given this new ramping, whole new set of questions to deal with, whole new way of examining and trying to get that packaged up in a way that's still accessible to students and gives a good range of marks across the entire ability range, which is very wide for GCSE mathematics. I think they've done very well. There's one or two things we maybe would do differently and we will be doing differently in the future, which I'll talk about. But I think they've done very well as well.</p> <p>What we have seen in a lot of cases is it wasn't maybe as bad as people thought and a lot of people have been surprised at how well their students did in these exams and very pleased with their results in the end, so that's been very pleasing at our end to see that's the case. So I think that has surprised a lot of people. I do think there's been question marks about did I enter my students for the right tier or not. Some have said to me I wish I'd put them in for foundation and some have said I wish I'd put them in for higher and for those ones aiming for 4-5 it doesn't seem to have fallen particularly in one way or another to me. I'm not getting a feeling of it should have all been in one direction. We have seen a huge shift in the tier entry from 2016 where it was about 79% higher and 21% foundation at Edexcel, which I think we're the extreme end, to this summer being 47% foundation and about 53% higher, so almost half and half, so that's quite a shift. But I think that has worked well for a lot of students and made things a bit more appropriate.</p>
Slide 2	Polls	<p>What I'll do next is have a look at some data, but first I think we're going to have a few polls. This slide of course gives next year's grade boundaries and quite a few of the questions we're going to use, I hope you can all see that. Ha ha, I'm so funny. If not, we're going to have some polls just to find out who's here, who's with us, just three quick ones, so everyone can get a sense of who's listening. And I'd be interested to know if we've got more people from schools or from FE colleges, because FE colleges are coming online now, they're the first to go through the resits probably</p>

		<p>with these new exams in a lot of ways, so all students resitting will be doing these new exams as well and that will be quite a challenge I think.</p> <p>OK. I'll ask for those results to be broadcast when they're all in. Actually having a look at those I see that some of them, they're not all mutually exclusive are they, heads of department are often experienced teacher. But I hope this turns out to be a useful session for you and you'll get the recording, so if it's good enough perhaps some members of your department can hear it if it's just you at the moment. Broadcast the results. So a lot of head of departments here, thank you very much for joining us this afternoon for this session.</p>
Slide 3	Mock 1 distribution: Foundation tier overall	<p>OK. We did run a mock exam in December of last year in the run up to this and we collected quite a lot of data. That was quite a successful exercise for us. We had around 110,000 students for that, which is a bit more than a fifth, nearly a quarter of what our usual cohort would be, so it gave us a very good idea of how students might do even though they hadn't covered the whole curriculum at that point, even though mock exams have their own problems and students aren't always themselves, fully prepared or ready to do it, but I think a lot took it very seriously and the mock exams did stay very secure during that process, very pleased with that.</p> <p>What we've got here was the results of the mock and how it looked. And that's the sort of shape of the distribution at foundation tier, so we've got a mean mark of 73 out of 240, which I did write down earlier on, which is quite low. It's about 30%, that one, on the foundation tier. So it showed that the foundation tier was a lot more challenging than it had been, starts slightly above maybe the sort of G question level, goes all the way up to some questions that you might think are sort of B grade questions towards the end, because the new grade 5 is two-thirds of the way to a B.</p>
Slide 4	Mark distribution: Foundation tier overall	<p>I think it did lead to a lot of people thinking about changing tier for students, and when we looked at the summer distributions, sorry, these aren't quite the same, they don't look quite the same but you can see the sort of change in the shape of that one, a better mark of about 44% overall for foundation in the summer. A tailing off to the right hand side for the higher marks but that's always expected at foundation because students that might be getting over 200 tend to be identified as the students that should be going into higher anyway, though we did get a handful of students getting over 220, so there's a story there at foundation as to why they were doing foundation. But there were some in there.</p>
Slide 5	Mark distribution 2016: Foundation tier overall	<p>Compared to say last summer, the mean was a bit higher, the mean was 56.3 and you can see there's a bunching more to the right of the graph in previous examinations. I think this is showing us even though we think a lot more of those middle candidates that might have been C, D-ish in the past that might have moved onto the foundation, still shows you the challenge of these papers was quite a lot more, that the mean went from 56 down to 44 at foundation.</p>
Slide 6	Mark distributions: Foundation tier	<p>The other thing we saw was a pretty even performance across the three papers, so there wasn't a dropping off particularly, it wasn't found that the, say the non-calculator paper was particularly harder. If anything there's a feeling that the second paper was the hardest, and the mean marks, although they're a fairly crude measure, yet just a slightly lower for 2F. I think we found with 2F that there was a bit of an imbalance in that it was easier to start and harder to finish.</p>

Slide 7	Mark distribution: Foundation tier overall	And what the next slide shows for foundation is kind of where the marks fall in terms of percentage, so you can see the fall off as the students go through the papers. On average picking up about 60% of those first 290 marks, 46 of the second 20, 43 of the third and 27 of the fourth on 1F. 2F you'll see that they're picking up more marks at the beginning but fewer marks towards the end, and that's why I say maybe there's a bit of an imbalance there. And the third paper, again a lot of people felt that that was a bit kinder, they were getting more marks right in those first 20 but then quite a falling off. The final quarter is those kind of grade 4, grade 5 questions in a lot of ways, and many on average students picking up 4 or 5 marks really in that final quarter, so still quite a challenge there moving onto those 4, 5s. Again probably a lot of the grade 5 students are those that you'd identify as likely to get grade 5 maybe being put onto higher in the hope that they may get a grade 6 and quite rightly in that respect. So maybe that's the sort of pattern that we might expect.
Slide 8	Mock 1 distribution: Higher tier overall	With a similar story in higher, though when we ran the mock again we got a sort of 30% as an average and you'll see that skewed negatively, I think that is very bunched around that sort of 80 marks out of 240 and then quite a tailing off on the mock. But the mocks were quite a stiff challenge for a lot of students, so you know, those getting the higher marks at the end were doing very well at that point.
Slide 9	Mark distribution: Higher tier overall	When we look at the distribution for the summer it has changed a fair bit. Doesn't fall off as steeply as well, so there's a lot of students able to get those higher marks and actually given that the nine was set at 190 that was probably higher than I thought it was going to be and I'm very impressed that so many students managed to get that many marks, so it was about 6% on the higher tier overall were getting over the 190. And that was quite challenging to do. It's a mean of 46% so it's quite a rise on what we saw from the mocks. That may be because some of the grade four five students were moved over to foundation certainly, and it can be just to do with improvement in the students, from the work they'd done and from the extra time they'd had from the mocks to the exam.
Slide 10	Mark distribution 2016: Higher tier overall	Compares to that sort of shape from the summer before, when the mean was about 51, 51.4, and not quite the falling off at higher tier. You know, in the past we've always had quite a few students getting between 90 and 100%, often in the 100s getting 100%. It didn't happen this summer, there was no one who got 240 marks on the higher tier in the end. Someone did get 239, but so we'll wait for our first 240, see if that comes in November or next summer. But generally a huge improvement from the mocks, but I think that they were a good preparation even though we couldn't give boundaries on those. Just showing a slight difference to what we'd been used to.
Slide 11	Mark distributions: Higher tier	Again higher tier, similar sort of mean marks to the foundation and similar performance across all of them, 2H again we'd had reported that that was possibly the harder one.
Slide 12	Mark distributions: Higher tier overall	And you can see a similar sort of thing where, as the marks fall off, particularly on 1H, students getting a lot of marks from the first quarter on average and then falling off, falling off quite sharply on that one. 3H possibly a more even performance or certainly at the beginning, and that I think contributes to the perception that students and possibly teachers have of the papers, if they start well they're considered to be a more reasonable paper, you don't get stuck early on shall we say.
Slide 13	Summer 2017 performance data	OK, I'm going to have a look at some questions now, but just before I do that I'd just say the performance data is available, and you might need to put this slide full screen

		<p>just to get a sense of it. But we've produced the average performance data for all the questions, so this shows you the spec reference, it shows you the assessment objective being tested, the sort of topic area, whether it's algebra, statistics, number, that sort of thing. And it shows you the average mark that students at each grade got, so it would show you maybe a grade 7 student might get 4 out of 5 on a particular question, and that's just sort of average.</p> <p>So you can get a sense of, so if anyone says to you I need a grade 7 question to know if I'm going to get a grade 7, better to say here's a set of questions, here's the sort of mark a grade 7 student would have got on it, can you do the same? So then you'll be on target, so I use these say if I'm making up practice papers where you can get some performance data, to get a sense of how students have done.</p> <p>I've used this, and you'll find it in the download, I've done the six papers in, I've done the six papers in order of difficulty that students found them on average, so that's interesting in the way it changes the order of the questions a bit, and may be a different way to test your students, see how they do with that changed order, so they're in the download. There's also data on this on what percentage of students got zero, what percentage of students got one, etcetera, all the way up to full marks. So there's lots of ways of looking at how students have done generally across the cohort, so that if your students use these questions for practice it gives them a sense of where they are and how they might compare to the population.</p> <p>I've used this in conjunction with results plus data for your own centre which I hope you get a change to download and have a look at, and if you're really keen there was the access to scripts this summer where you could see exactly what your students had done, download their scripts, use, find out where they may have gone wrong. That did close at the end of September, I believe it's going to open again very soon, maybe for a month or so, that's your scoop for this afternoon, I don't think it's been quite announced yet but I believe that's going to happen so we'll let you know when it's open again if you missed it before. And you would like to have access to students' scripts, you'll be able to do that.</p>
Slide 14	Foundation tier: difficult questions 1	<p>OK, onto a few questions then. And things that I'd say difficult questions, these questions are difficult if you can't do them and not difficult if you can do them, I think that's true of a lot of maths questions.</p> <p>This one was the first one where there was a real problem on foundation tier. It does perhaps illustrate that there's an increase in demand for algebra across both tiers, but in foundation it might look marked, and we have had questions like this before, but this seemed to be just a touch too much, too many fractions, two and a half, question three, in the end only 12% of the foundation students were able to get this, and that's across the whole cohort, so just a few things too many.</p> <p>We've had, now looking back I looked at June 2013 had w over $4 = 8$, it had a 36% success rate, the old foundation, and June 2015 we had a y over $5 = 10$, and 43% got that. Those questions were slightly later in the paper. They were a bit kinder because they don't have the fractions, so students didn't know how to deal with that. So interesting it might have been to know how this might have been performed if it'd been question 20 or something and students would expect it to be a bit harder, but evidently a lot left that.</p> <p>So it's something for examiners to be aware of, on how they're testing these things I think, and we're being made aware to say when you're testing certain concepts do you need to make the arithmetic that difficult. Sometimes you will, but you don't</p>

		<p>always have to, if you're testing a particular concept. Now there's another example of that coming up a bit later, so that was certainly the first problem on 1F.</p>
Slide 15	Foundation tier: difficult questions 2	<p>Again this was quite an early question, it was a question 2 and it's write the number correct to one significant figure. Still seems to be something that foundation students do find difficult generally, sort of significant figures, decimal places, rounding, estimating, they all come in the same broad area I suppose. But this was probably set as a fairly early style of question 2 on 2F, as a one-mark question, and examiners are going to try and start now with the foundation tier students with a lot more one-mark questions.</p> <p>But I think this one maybe just had a bit too much going on, in that we got a lot of answers of 60.00 and we got a lot of answers of 6 to this, and students didn't really know what to do. If you're writing down 60 maybe you don't feel it's one significant figure. It feels like two. We had a similar question in June 2016 which was 3648 to the nearest hundred and 80% got a mark on that one, so that's, it's a different way of asking a similar question but I think this was just maybe a little more difficult.</p> <p>Then the other thing I'd say here is, it's always felt that estimating and rounding is always to one significant figure. That won't necessarily be true in questions that come up in the future, it will be looking to round, for estimation rounding to an appropriate figure, so sometimes if you're given, I don't know, say if you were given 30 over 1.5, that's not much of an estimation, but it's to say don't estimate it to 30 over 2, make it 300 over 15 would be a more appropriate way, well, gives you an exact figure but you know what I mean. That is trying to get an estimate.</p>
Slide 16	Foundation tier: difficult questions 3	<p>This one didn't go down well with students we found. And again it is an estimation, but it's about knowing real figures. That is a real requirement of the syllabus, in knowing what's sensible, and what's sensible is all about estimation isn't it, knowing what's a sensible answer so that, you know, examiners will write questions in context where the answers should be sensible, so electric bills won't be £30,000, cars don't go at 10,000 miles an hour. It's knowing what's sensible, and knowing about basic measures.</p> <p>So we were taking anything between 1.6 and 2 metres for this man, 2 metres would be a tall man but it's probably not the average man. I think some students found it difficult in that they thought they were being tested very specifically on an average height, and that's a bit more precise and it depends where you take it. I think the average height in Holland for a man is about 6 foot 1, they're a lot taller. And 5 foot 10 in the UK, and what's that, about 1.8 metres but we accept 1.6 to 2. So that was a difficulty, but it is a requirement. I have seen, some schools seem to have it on the wall, they have a lot of average heights of, I don't know, eleven year olds and basketball players, I saw it in a school the other day.</p> <p>So good for students to know, cause as has been pointed out to me a few times, this little man has turned up in a few questions, he's a stock man, he looks like he's walking away from a scene of a crime, but he will turn up from time to time.</p> <p>The estimate of the height of the tree, we saw, we were expecting students to get five or six times what they estimated the man, and a lot of problems came up there with arithmetic, they knew that he was 2 metres and then they make the tree 90 metres somehow. It's question whether that's a sensible answer. You can get a 90 metre tree in California apparently, but it's getting that sense of measures of all sorts that will be part of the curriculum.</p>

Slide 17	Foundation tier: Difficult questions 4	<p>This was again a very early question, and only 13% got this and I think the examiners thought that it was probably quite a nice gentle, you know, an m^3 and an m^2 cubed is $2m^3$, how could it be anything different, but of course we saw a lot of m to the 6 and m to the 9 because students thought they were being tested on indices.</p> <p>So 15% is quite, it's lower than expected for that. In previous years, in 2015 we had a, what was it, b^3 to the 3 times b^4 over b^2, 18% got that, so did better on something that was multiplying and dividing. p^5 times p^2 in another exam, about 52% got that, so they'll know it when it comes to multiplication. That addition evidently put a lot of students off.</p>
Slide 18	Higher tier: Difficult question?	<p>Just one for the higher tier, I put a question mark cause this wasn't a difficult question in the end. This was one of the best answered in the end on this bout, 79% got full marks on Daniel bakes 420 cakes, we all got an education on this one as we learned that 420 was slang for marijuana, which we didn't know before but the students were quick to tell us. We thought 420 was just a nice number with lots of prime factors. But no.</p> <p>But I compared this to a foundation question from 2012, which was very similar but was about a test with 40 marks, didn't have the ratio part in it, students averaged about 35% on that in foundation. They got 49% on this one of the foundation tier, so being able to deal with these questions better certainly than five years ago on average, as I say about 80% of the higher tier students were able to get full marks on this.</p> <p>I'm going to go to the crossover questions, we did have a lot of queries and you know, it may be regrettable that there were quite a few things missing, and trigonometry from foundation level was one, I know a lot of people had been teaching students trigonometry for the first time and it wasn't tested. We are required to test everything over a three year cycle, so over three years everything on the curriculum will be tested at some point. It's probably wise of examiners not to go in and test every new thing on the first exam, but they did miss frequency trees at both tiers, functions were missed at higher tier, so I know a lot of people felt that it was a shame those things were missing.</p> <p>Hard to know, I don't know if they were in an earlier draft and got missed for some reason or got rewritten or revised out of papers, but it's something for examiners now to have a look at, to make sure that that coverage is right in the future examinations.</p>
Slide 19	Crossover questions	<p>Right. We'll have a look at crossover questions now, and these are the ones that have appeared on both tiers, because I think they're interesting in seeing how students perform and giving us a sense of what a, perhaps what a 4, 5 sort of question should look like, what it might look like and perhaps indeed on a couple of occasions what it doesn't look like.</p> <p>The marks here are the sort of marks that the students were getting from the crossover questions on each paper, depending on the grade they got. So again they're sort of average but say on the papers, a grade 3 on the foundation they were picking up about 7, 5 and 7 on those first three, from those crossovers. Grade 4 a bit more, grade 5 a fair bit more again. But on higher tier those students were picking up, the ones who got those grades were picking up a few more marks. That's kind of what I would expect because if they're doing it on the higher tier they need to get some of those marks on the crossover questions, cause chances are if they're not breezing through those in a way they're not going to get more beyond those crossover questions, so they're very much relying on those 4, 5 questions as where to find the marks. I think at foundation they're relying a bit more on the questions that come before that.</p>

		<p>Where I think it works is possibly in reverse, is to say if you take the crossover questions and you use those as a test for students you'd expect them to be getting a certain amount if you think they're going to go on and have a good go at the higher, so a rule of thumb that kind of got borne out was that you'd want about 60%. And that is very rough, but say a student would want to be getting around 60% on those common questions if you thought that they might go on for the higher. If they're not, it could well be that foundation is the best route for them.</p> <p>I find it very difficult on the tiering. I don't feel that I know and I don't know if anyone does what the difference is between a student who gets grade 4 on foundation and a student who gets grade 4 on higher tier. I feel that they have had a slightly different mathematical experience, they've had a different experience of the examinations, hard to say if they are, you know, the same sort of ability of student at all. But that is the measure that we have and that's how the grading works, the 4, 5 is a crossover. But just finding the tier.</p> <p>Do use the crossover questions, so they've been made up, we made them up, they've been up for us for this summer, they're available on the emporium website, but we've done them for the mock and the specimen exams as well. So there is a series of short tests if you like, they're about 20 to 25 marks or so that you can give students just to see how they get on. The thing about the crossover questions is that for the higher tier students they will be the first questions that they see, so if they are really finding those difficult the exam experience isn't going to be very good for them, because beyond that there's a lot more harder questions than you see on the crossover.</p> <p>I'd like to do a little more with that and I'll have a look at the results plus data and see if there's something that I can give out that suggests as a sort of performance, because even the crossover questions are a bit variable, there are maybe one or two that in hindsight I'd say shouldn't have been crossover questions, you might need to take them out of the reckoning. So we'll have a look and see if we can get something that's a good, decent test of 4, 5 students, get some sense of student performance on those questions and use that as some sort of diagnostic.</p>
Slide 20	Crossover questions 1	<p>First one I looked at, just for the traditionalists was this one. Those appeared, this is a 3-mark question, appeared on both of them. On foundation about 27% of students were able to get 3 marks on this. In some ways maybe that's not a surprise, but more of a surprise maybe on higher tier about two thirds, just over two thirds of students were able to get full marks on this. So I'd expect those getting the 7, 8 and 9 to be getting that, but it still seems to be a problem in the middle maybe, there still seem to be some students who have difficulty with this on the non-calculator paper.</p> <p>It's been put to say why would a student ever need to know that or be able to do it, and maybe there's a question there, everyone's got a calculator on their phone or on their watch or all sorts of places. You know, what is the context here that could be 54.6 times 4.3? Yeah, we'll work towards that, it's on the curriculum, it's on the syllabus so there's a chance it will be examined as a skill. I would hope it's a fair, a fairly easy 3 marks but evidently not. We did test, the last time I could find this tested on a summer paper was back in 2010 where we had 4.52 times 36. We had about the same, we had about two thirds of the higher tier students were able to do that, and about 30% of the foundation tier, so very similar numbers. So in the seven years since 2010 the sort of, the attainment on this sort of question has remained just the same. So I suspect it will always be a difficult one.</p>
Slide 21	Crossover questions 2	<p>This was a crossover question which the eagle eyed will have seen a version of it on a 2002 paper actually. This I think turned out to be a, you know, a test of algebra for foundation which maybe was a test too much in the end. I think part of it may have</p>

		<p>been the show that aspect, I think there are, you know, the 4 and 5 students should be able to do the x plus 3 squared part of it, but maybe the rearranging, you know, using the 10 centimetres squared and the rearranging to show that x squared plus $6x = 1$, it's in the way it was asked that made it so difficult.</p> <p>So in the end, 3-mark question, 5% of the foundation students were able to get that, 90% got zero on this question. It's a, you know, it's a test of fairly basic algebra but I think it's the problem solving aspect that made it so difficult. At higher tier, average mark was about 2 out of 3. But 60% or so did get the 3 marks, it gives it more a feel of all or nothing at the higher tier. It would make me wonder if, you know, if that's a top end foundation, maybe, I mean it was question 24 on foundation but you know, it might veer into the 6. Or it might veer into a this is what foundation tier students will get used to, be able to deal with in the future.</p> <p>I did look back and find a similar question on 2016 where it was a rectangle but it was given that it was x by x plus 4 and you were told that the area was 45 and so had to calculate x, which was a slightly different way of going about it, and a more directed question I think. Tells you what to do, you do have to rearrange and solve in that respect. And it did perform a lot better, it was on higher tier at 80%, students getting it on the higher, on foundation it was about 39%. So ask this question in a slightly different way might get a better response. But it's this 'show that', I think that it's the sort of language that's going to need to be learned, and new to foundation but need to be learned.</p>
Slide 22	Crossover questions 3	<p>Similarly we had this question on rectangular frame and Pythagoras. Pythagoras is one of those crossover topics, always considered to be a grade C, but it depends how you test it, you can make it a grade 8, you can make it a grade 9 question, Pythagoras, if you want to.</p> <p>But again this one performed a lot worse on foundation than it did on higher. Similarly to the last one actually, about 5% of students got full marks on this on foundation, so that's really the top half of the grade 5. And about half on higher tier were able to get all the marks. A lot of students got one mark, they could get that they were doing 5 squared plus 12 squared, they might get as far as 169, but without a calculator the square root of 169 was a step too much I think for a lot of students. And maybe that question could have been made a big gentler by making it, you know, 144 or 121, something where it's on part of your times table.</p> <p>The other aspect of it had to be that you then had to multiply everything by 1.5 to get the lengths when you've got a total weight, and just realising that this was a model of sorts that you had to deal with. There were students who multiplied 5 and 12 by 1.5 before they started, and that really made things very difficult indeed. So I think it's a sense of getting what a model is and working to the problem, finding a structure of how to approach this. This is part of the problem solving, we'll have a look at a few more of these. But again something to be aware of.</p> <p>We had a Pythagoras in the past and we had one in 2015 which was similar to this, it was a metal frame, it had 2 diagonals, it was 20 by 30. Students had a calculator and just had to work out the length of the total frame. But at that time on foundation, very similar performance, about 90% got zero on that, about 6% ended up getting the marks. That was with a calculator, Pythagoras seems to still be quite difficult for foundation tier students to cope with. Possibly perhaps if it's put in a context like this rather than just being given a triangle and being told to find the hypotenuse. But again something to be aware of, these sorts of topics turn up in some sort of problem solving and end up being quite difficult.</p>

Slide 23	Crossover questions 4	<p>I'll have a look at these but also the next two questions is thinking about the language that we use, it's often brought up at teacher meetings about wordy questions. I think there will always be some wordy questions, there will be one or two that are about taking a context and being able to solve it mathematically, taking things from the context and being able to represent it in some way. But we need to be careful on how we do that on the context that we choose and the words we choose.</p> <p>And this one in some ways, yeah, how did it get as far as it did because it had two main problems, one was using theatre as a context, I know that a lot of children won't have been to a theatre. I can't say I've been myself a lot in the last few years. Won't be aware of what a circle and a stalls is so that adds just a little layer of confusion. Also we're told don't use the word circle in a question that doesn't have a circle. So accept that, you know, we'll be looking at, or examiners, I won't be, but examiners will be looking at that a lot more in the future to deal with that sort of thing.</p> <p>This one also as a problem was asked in a slightly different way from what we're used to, it wasn't really asking for an answer, and it was asking, you know, you to persuade the examiner whether there were people on more than 60% of the seats or not, and show your working to do that. So a bit like the old quality of written communication questions that we've had over the last two years.</p> <p>So that's still there, but again as a crossover question, it didn't go so well at foundation. About 13% got all five marks, but 58% got zero on this, so I don't know if that meant they started or not. At higher tier we had 57% getting all the marks and only 16% getting all the marks, so it did seem to sort of divide the students up, higher and foundation, this one, for all sorts of reasons.</p> <p>What we don't have at the moment, but we're going to get next year apparently is examiners will be asked to write a zero for questions that students have attempted and not got any marks on and possibly an x for questions that have been left blank, so it'll give us a sense of whether students attempt questions or not when they get a zero, I think that will be some very useful data, and tell us a little more about what questions students do and give us a better average, cause some students, some questions have a low average and we know it's because a lot of the attempts were left blank. It would be better to get a sense of how well the students do that actually attempt the question.</p> <p>Also with this it gave me an idea I'd like to produce some sort of papers just to see how this works, to do language in a different way, to use words that don't actually mean anything at all, to see if students can deal with questions where you don't need to know what a circle or a stalls is, you could call it anything, and whether that helps or hinders in a way or whether it gets them practice to say I can do this question without needing to know what the things mean, you know, they are just a thing and another thing, but I would hope that by addressing the questions that won't be a problem for students in the future.</p>
Slide 24	Crossover questions 5	<p>Another question we had on both foundation and higher tier was this one about driving from Liverpool to Manchester and Manchester to Sheffield and finding average speeds. Again foundation, about 14% average mark for that, I think it's four mark, so not very high, less than one. A bit better at higher, about 2 marks out of 4. Still probably a bit lower than you might expect on higher tier. But average speed is quite a difficult concept.</p> <p>It's really the second part, and the second part was put in because you have to, we have to assess the new assessment objectives, and this one was the one about evaluating the methods used. So working out an average and saying is that the best</p>

		<p>way to work out an average. There's a lot to read here, there's a lot to process, and you've got to write down an answer that's a reason, that's not a sum, that's not a number. A lot of students don't like to do that and I can imagine quite a few actually just saw this and said for one mark I'm going to turn the page and try and do something that I can do. I think this turned out to be quite a long question for that one mark that tested that assessment objective. So maybe we'll look at different ways to assess that objective. I think there's one or two objectives in there that are good practice and wouldn't we love students to be able to assess the methods they've used and critique them, but sometimes in a timed exam that's not what they want to do, and it can be very hard to test that and get students to engage with that sort of question, unless they are quite confident.</p> <p>Right, I think that's all I want to say about that one.</p>
Slide 25	Crossover questions 6	<p>This was crossover, this is a new part of the specification, it's about error intervals, just knowing about an error interval that was on both, both tiers. This one did appear in the mock exams or the specimen papers, appeared once or twice I think, more or less exactly the same question with a different number, but at foundation tier, only about 2% of students got both marks, nearly 90% left it, got zero, left it blank or didn't know what to do with it. At higher tier only 24% got both marks, but another 42% got one mark.</p> <p>What we didn't do in this was give anything in the answer line. So it's testing two things, tested whether you knew to round up and round, how to round at either end of an error interval and what strict or otherwise inequalities to use and how to write that, so there's quite a lot to be tested there. I do know that this one, a similar question appeared on both the other examples early in the paper, and they have less than or equal to n less than on the answer line, so all the students were having to do was fill in either side. That's a lot easier as a version of the question, and I can see that examiners might test it that way in the future, might make it earlier in the question.</p> <p>So depends what, depends what you're testing. I think we've done that on practice papers, I've stuck that on the answer line to give students a clue. But it just goes to show that you can take the same sort of thing and test it in slightly different ways by the information you give by what you put on the answer line. What I think it is is that a lot of students haven't come across the term error intervals, even though it's on the specification. It's one of those little things that's new on the curriculum that probably got missed by a lot of teachers.</p>
Slide 26	Crossover questions 7	<p>Good news though was Venn diagrams, this was answered very well both tiers in the end actually. Foundation, over half got those first 4 marks for filling that Venn diagram on, although it hasn't been on the spec before and isn't on any past papers unless you're using IGCSE, and higher tier about 80% were getting the mark, full marks for part A. Part B a bit more of a probability question of interpretation here, didn't do so well on that at foundation. About 16%. No, less than that sorry, about 4% were getting all the marks on that question. And about a quarter of the marks, a quarter of the higher tier were getting all the marks on that question, so the probability did for them. But being able to deal with the notation and fill in the Venn diagrams, very pleased to see that that didn't turn out to be a problem in the end.</p>
Slide 27	Crossover questions 8	<p>Simultaneous equations I just put in because it's new to foundation and it's a top end and it's always been a problem for, it's going to be a problem at foundation, I think there's quite a lot to process here and a lot to learn. In the end about 3.4% got the 3 marks on this 3-mark question. At higher tier about 45% got all the marks on this one. There are minus numbers to deal with apart from anything, I think that the</p>

		<p>examiners will always set these so that they're not whole positive numbers so that you can't do too much trial and improvement, but it's better on the higher tier, and we had a similar question a couple of years ago where about 31% were getting all the marks on a simultaneous equation on higher tier like this one, so things have improved there if you like, it's gone up to 44%.</p> <p>So it's a straightforward AO1 kind of process question, and I think student sare getting better at dealing with these, they are quite familiar. It's the sort of question that grades 7, 8 and 9 should be getting full marks on, and generally they got very close to full marks, on average those that got 7, 8 and 9.</p>
Slide 28	Crossover questions 9	<p>Right. Last of the crossover, I'll look at thus one about gradients and this perhaps is a good illustration of why we don't assign topics to grades. Because this is, we call this grade 4, 5, it's about understanding $mx + y = mx + c$ and what the m means and what the c means and what that looks like in a graph, but this one appearing on the foundation I thought was quite a surprise to me. I thought this is, you know, if you're going to call this a question I'd call it a grade 6. I think conceptually it's very difficult for students to know what to do, I think the subsequent notation is unusual and probably unnecessary, they could have been called lines m and n, I don't think we needed the 11 and 2. Students have got to rearrange here and divide by 3 to get, you know, equivalent, well that's one way of doing it, to get equivalent lines, but when you divide the second one by 3 you get a five-thirds term which makes you think maybe you've gone wrong. You know, I think maybe if we'd made that a plus 6 rather than a plus 5 that might have been a bit kinder. So there's a lot of work to do and it's only 2 marks to wrap those up, and as a result we saw something like 2.4% got both marks on foundation tier, but they'd be the best ones I'm sure, 92% got zero on that, how many actually attempted it I don't know. Even on higher tier, about 53% were getting the 2 marks on that, but a third of the higher tier students were getting zero on this question, so this was a, in hindsight maybe put it somewhere else.</p> <p>I think it's a useful illustration of a test of understanding of the topic in a different way, and students will need to always be prepared for questions set in a way that they haven't seen before. They could have done all the practice papers, all the past papers, there will still be a few that is a test of their mathematical understanding, and can they unravel what's there rather than can they recall when they saw something similar done before and do it again. Always a problem, students do complain that they've not seen questions like that before and the paper thus is like nothing else they've ever seen, but prepare your students for it, and if you've got, if you're testing any students I think this is a really good, it's an interesting question, and if it's interesting to me then it's probably going to be too difficult for students, but I like the way it's laid out, I didn't like seeing it in a foundation paper, but as I say I think it's a good test and if it's in the right part of a paper, very reasonable to test the understanding.</p>
Slide 29	Problem-solving questions	<p>Going to move on just to a few problem solving questions. This is the sort of percentage of AO1 marks scored by students getting each grade, and the AO2 and the AO3, so these sort of straightforward technique questions, the reasoning questions, the problem solving questions if you like. There was a worry that it might fall off a bit a lot more for the problem solving but it doesn't look like it has. It has a little bit if you like, that students don't do so well on the problem solving, particularly at problem solving as they go down the grades, but not so much at higher and maybe, and that is a reflection that actually some of the straightforward AO1 questions can be very difficult, you know, they're straightforward in they tell you what to do but you've got to be able to crunch a lot of algebra to be able to do it, and sometimes the</p>

		problem solving aren't that much harder. So it's fairly similar across the assessment objectives at higher tier, we found.
Slide 30	Problem-solving questions (F) (1)	<p>Problem solving is a difficult one to define in many ways because it's only a problem if you can't do it, if you can do it it's not a problem, but we do want to have problem solving at all levels and this is one, a 2-mark one on foundation, question 4. There's no structure to this, it doesn't tell the students what to do, it is a very, you know, basic introductory problem solving question, so it does count as it were, we do consider that AO3.</p> <p>This turned out to be very much an all or nothing, 43% got zero, 49% got the 2 marks that were available, hardly anything in the middle. So students either found a way to deal with this, and who knows, there might have been a few trial and improvements in there, because it did have a calculator. Or they just didn't know how to approach it and didn't know what to do with it, so a lot of the test of problem solving is going to be about finding problem solving questions and getting students used to dealing with them, looking at them, finding a strategy. Not being scared by not knowing what to do the moment they start, not having necessarily a way in. And that's what I'd say about the problem solving questions is that what a lot of it means is that there's not a lot of structure, there's not a lot of instruction on what to do, and that's, it's very difficult and we've known it for years, they tend to be always the hardest questions are the ones that don't tell you what to do and don't tell you where to start, and this is part of the whole new curriculum that's coming in from year 7 onwards, is to deal with the problem solving. In some ways they can be nicer questions and students who can do them I think get a great reward from having tackled them.</p>
Slide 31	Problem-solving questions (F) (2)	<p>This one was a non-calculator one. Didn't perform that well in the end. Average getting about one and a half out of 4 on this.</p> <p>I think there are two things here, cause it's a non-calculator I think a lot of students missed that the area of the rectangle was six times the area of the triangle, and I must say I did the first time I did this, I just said oh, the area of the rectangle is the same as the area of the triangle, you know, it's one of those. So you know, good lesson for me. But you do end up, if you got the triangle to be 36 and you do 6 times that was 216, you end up having to divide 216 by 16, and because it's not exact if you like students again might feel they've gone wrong or they find that a difficult thing to do without a calculator, to find a width of 13.5.</p> <p>I did myself feed back to the examiners to say I didn't like that diagram because that width suggests, it doesn't suggest 13.5 to me, it suggests you might have gone slightly wrong, and possibly when I did it my answer was more suitable to that diagram. So I think, you know, fed it back, although as I say I don't see the papers I do have an opportunity to feed things back to examiners that I hear from teachers that I pick up myself, so send us anything you have, if you want to make comments about any parts of the papers or questions, it is something that we can feed back to the examiners to consider for future papers.</p>
Slide 32	Problem-solving questions (F) (3)	<p>This I quite liked as a question, and it's one of those that will test link across different areas, so it does link across the algebra and the geometry, but there's some words in it again, it's representing a word problem and being able to represent it algebraically. It's got a bit of an all or nothing on foundation as well, it was a five-mark question, 20% of the foundation tier got full marks, 75% got zero, hardly anything in the middle, so they either knew what to do or didn't. I think these are not entirely unfamiliar questions is setting up something like this and knowing how to set it up</p>

		<p>algebraically, so taking one angle to be x and doing $2x$ or x plus 1 or whatever, but then you've got to apply it to a triangle so you've got to know how many angles there are in a triangle, and you've got to make sure you revisit it and make sure you get which one is the largest and which one is the smallest and things like that. But I was quite pleased to see that so many actually were able to get 4 marks, I would like it to be more, but better that it wasn't one where they struggled and went nowhere.</p>
Slide 33	Problem-solving questions (H) (1)	<p>Have a look at a couple of higher tier ones now. This I'd say is one where students wouldn't have seen one like it before and it's a new part of the spec about counting strategies, things like that.</p> <p>Not very popular at all, examiners did note that the majority got at least one mark and kind of Brexit majority, 52% got two marks and 48% got no marks on this. But it's different and it's unusual and it relies on knowing that 215 can't be divided by 17.</p> <p>But I think an interesting or useful test of mathematical ability, you know, the grade, most of the grade 9s were able to get this, the grade 7s, about half of them got it, so it still feels like quite a testing one in the end, even for the grade 7s or the A grade students if you like.</p>
Slide 34	Problem-solving questions (H) (2)	<p>This one I've put in as an illustration of the sort of algebraic technique's that are used, and if anything caught me by surprise about the new GCSE papers it was the level of algebra required, and I would in a sense like to have known that before to help prepare teachers and students for what was coming in the way that I'm allowed to help in that sense. Certainly some questions towards the end of the papers, I thought there was a lot of algebra required.</p> <p>This one, it falls out if you know as long as you're doing your half ab sin c kind of thing, but you've got to manipulate a root 2 in there, you've got to know, as was promised you've got to know what the sin of 45 is, and there's a half gets in there as well. So it's just quite a bit to unravel before you get to a quadratic that has to be solved to find x, so a lot to do there.</p> <p>In the end about 13% of the higher tier were getting full marks, so I would say, you know, that's your 8 and 9s, but 59% were getting no marks at all, so quite a lot of higher tier students not knowing where to start on this one. That said, 18% got 2 marks so there was another substantial amount that were able to make a start on it. But possibly, and what do we know, how many students look for a right angle triangle there and will draw in the right angle even if it's not there sometimes, but I thought just as an algebraic manipulation, quite a lot to do on this one.</p>
Slide 35	Tough questions (1)	<p>Whether it compares to this one, I thought this was one of the toughest questions that we had, I had a look at some tough questions. In the end, even the students who got grade 9 on this on the GCSE were averaging 2 to 3 on this. There's a lot to do, a lot of understanding of indices. I think that this is a question that could happily appear on a C1, I think as question 18 may be a fair enough if it went a bit later. There's a lot to do here.</p> <p>Your answer is $\frac{29}{20}$ which doesn't feel like an answer, or 1.45. Students did have a calculator so they could put this back in a calculator to check it had come out right, it's a bit longwinded, but those students who were able to put in a good algebraic answer to this I think deserve the marks that they got. I didn't, I did think that this was quite a tough one. That's not to say we won't see questions like this again, we will see tough questions, and the demand of the GCSE has got that much harder and at higher tier you will see some questions like this from time to time.</p>

Slide 36	Tough questions (2)	<p>This one I thought was interesting. It was one of the, one that students found most difficult on 3H even with all the other tough questions on there, and the average was one mark out of 4 on this. But even the grade 7 students were getting about 28% on this, grade 4 students didn't get near it.</p> <p>There were a lot of ratio questions on the new paper, there's a lot of emphasis on ratio in the specification and on the new curriculum so there will be more questions than they have been. There were, another one that wasn't particularly well answered was the one about black and white shaped squares and circles. Ratios that come in 3s, I think this one if you drew a picture it made it a lot easier. I do think when I started looking at these papers I thought that there's an algorithm really to deal with these ratio questions, and once you've got that, I think they fall out fairly easily. I think these will end up being a lot better answered over time, and there will be, I'm sure there will be more of these sorts of questions around ratio.</p> <p>And what I'd say, I'd give as an example say the recurring decimal questions, turning a fraction into a recurring decimal or the other way around, that we've had many times, and I looked back to June 2012 which was one of the earliest versions I could find of that, average mark for that was 12% at the time. Even A grade students were getting an average of 3/4 out of 3, you know, A star students weren't doing that that well. In what was it, June 2015 the average mark had gone up to about 22% and the A grade students were getting, averaging 1.7 out of three.</p> <p>The one we saw on this summer's paper which was 2 cause you had to multiply two recurring decimals together and show, I think it was 1 over 33, the mean result was 48% on that, and the grade 9 students were virtually all getting 3 out of 3. The grade 8 students were getting, or grade 7 students were getting 2 out of 3, a bit more or thereabouts. It's one of those where students have understood and learned what has to be done, and teachers have learned as well and I would hope learned the concept and understood the requirement there. It's a good illustration of that.</p> <p>Another one is say the prove questions where you've got an integer n and you have to prove if you add three consecutive ones together they'll add up to something, you know, they'll always be something else. We had quite a lot of these on the linked pair pilot and you can find a list of them on the Emporium on the themed questions. 2012, I know the average mark on there was 10%. Now it's nearly 30%. They're still unusual but students have got better at those, and I think if you look at the linked pair pilot ones and students got the hang of that, it's one of those, once you've cracked that an odd number is $2n - 1$ and an even number is n, is $2n$, sorry, you've got a long way to go with that, you know, you can run a long way with that and answer those questions. I think they're the sorts of things that students will get the hang of. I think the ratio questions are currently unusual and they are quite hard, and in ratios of 3 they haven't been seen so much, but I think in time teachers and students will understand the requirements there and they'll get much better at those.</p>
Slide 37	Tough questions (3)	<p>One more, Mel told me this, she might be listening, she might have signed off, I don't know. This is the one of Homer Simpson in a box looking bemused, once seen can't be unseen. It's a nice question but a nice question can be a hard question, and in the end this turned out to be very difficult.</p> <p>It's problem solving, you're not told what to do, the dots are there really to give you a clue to make a triangle and use trigonometry to find the dimensions. A lot of students were able to find the width of this rectangle, a lot of students didn't believe that it was a rectangle and just thought it must be a square. But then trigonometry to find the height of the triangle was quite a lot of work in the end, even the grade 9 students were getting about half marks on this 5-mark question, grade 7 students</p>

		<p>were getting about 1 out of 5. So this is a really top end quite difficult question. But I think it would have been a nice one to use with your best students in the classroom when there's not the panic and stress of an exam, and see how they get on. In the end about 4% of students got full marks on this one. It is coming towards the end of the paper so you know, some might be running out of time. But I quite liked it as a question.</p> <p>As you know there were quite a lot of other tough questions and there was the one with a double cosine rule which could be answered by about 1 out of 200 in the end, probably a little too tough but you know, showing that there is a challenge for the grade 9 in there. There were lots that needed quite a lot of algebra, so I would point you again as we often do to the algebra awards and say use that with your students, anything that you can do to stiffen up the algebra will be a huge boon I think in the GCSE.</p>
Slide 38	Tough questions (4)	<p>My last one on the tough questions is to say these are always tough questions to students, anything that's give a reason, anything that's explain what you've done, things like that, ones that students don't like, often quite an easy mark, can be a difficult mark but often an easy one, students just don't like to do them.</p> <p>I have collected these together from these papers and put them as short, I think they're short 15-minute tests where I've just taken all the reason questions out and stuck them in one paper, absolute torture for your students but if they can get the hang of these and be happy to answer the reasoning questions there's quite a lot of marks that I think they'll be able to pick up and understand that sometimes maths is about interpretation and about showing what you know. So do endeavour to get students to have a look at these sorts of questions.</p>
Slide 39	Grade boundaries (1)	<p>I think I've got ten minutes left about, so I was going to just finish off having a word about the grade boundaries and how that, how I feel that's gone this summer. This is a picture of our grade boundary generator, this is how we work them out, and it's how we decide who gets what.</p> <p>It's been interesting I think this year in that the grade boundaries were fairly similar across all the boards, as indeed were the distributions of grades, they came out much the same. Ofqual did say from the beginning that C would be pegged to 4 and A would be pegged to 7 and G would be pegged to 1, so that those distributions were the same.</p>
Slide 40	Grade boundaries (2)	<p>I think a lot of the question maybe has been how many 4s and 5s are at foundation and how many 4s and 5s are at higher, for example, and that's an important calculation I would say. Have a look here, these are the sorts of boundaries and these are the sorts of requirements.</p> <p>There is a grade 3 allowed given at higher tier, I think it's been a great missed opportunity in moving to a new curriculum and grading system not to drop that grade 3 off the higher tier, I think it does lead to a lot of students being entered for higher tier who have a terrible exam experience, they may come out with a 3 but I would rather they were getting it from a foundation tier myself. But a 41 out of 240 is a 17% for a 4, and that is very low, that is, that is certainly lower than we would like it and we don't feel it's necessarily a good test of the maths. It shows more of what you can't do than what you can to get a good pass. But if it's, you know, if we were going to have 70% or so of 16 year olds getting a pass, that was the mark in a way that had to be accepted to do that, so it has been driven by, you know, the comparative outcomes and the promise that the students wouldn't be penalised for taking a new specification. I mean there's a sense in saying if you are setting a harder GCSE and</p>

you are having a new standard you have to follow through with that and make it a new standard, but then you'd have problems in who has to resit, with the current resit rules there's a lot of problems to take up with that and it's quite, it would be a quite bold thing to do.

But I think, in time I think that the 5 will be the sort of considered pass, I don't know how many years it'll take, and that does show that there's a little more to be done. I would, you know, I would like to see the grade boundaries go up and I think they will in time, I think as we finesse the papers as I think as students and teachers get used to the requirement, well particularly teachers get used to the requirements of the new GCSEs I think we will see a better performance of students and I hope that it will make them better mathematicians and I hope it will prepare them better for A level.

The problem this year I think has been with low boundaries and increased demand, there's a lot of students have not felt that maths is their best subject which is a shame and it may well have, and we're getting reports already, a kick onto the A level numbers. I really hope that they don't go into decline as a result of students feeling that they're not good enough at the GCSE maths, I think that, you know, I think as students get used to things that there will be quite an improvement.

So although, so I'd say use these grade boundaries as a guide to the mocks I think they're going to go up. I think, you know, EdExcel, we were always, up until now we were the board with the high grade boundaries, but that was intentional in a way to, that we had papers that showed what students can do. You can compare a hard paper to an easier paper and say I'll take the easy paper but sometimes you've got to get more marks on it, it can be harder to get a C than on a hard paper. And if people all felt that the easier paper was the way to go we'd have a lot more students taking foundation than taking higher, that's for sure. But you know, a lot of people are put in for higher because it's felt there's less marks to get, and there is still a lot to be dealt with on tiering I think and there's still a big question mark on what it means to be a 4 and 5 student at each tier. I would, you know, I would like to know a bit more firmly than I do.

Other things on this one, yes, you see the cumulative percentage, so about 11% of the grade 5s were given on the foundation tier of the 180,000 or so that were on foundation tier. And about 80, just about under 81% of 5 and above on the higher tier. But foundation tier 4 and above, which might equate to C and above, nearly 40% in previous exams, the C has been around about 25% of foundation tier students. So we have seen a big shift to the foundation tier but I think those students who have shifted there have still managed to get the 4s or the grade Cs by moving onto foundation, you know, an extra 15%'s worth have still achieved that. So I think they got what was required. I do think a lot of schools have told us they felt happy about the tier they put them in, of course there'll be a few that weren't happy, I think there were some whose students did come to a bit of a brick wall early on and ended up with a 3 because, you know, trying to get past the crossover questions could be quite a struggle for some. There were some who were quite cautious about it I know and thought oh well, maybe my student could have got a 6, and that's always a problem and I think it has been in the past, of putting a student in for foundation and them getting a C and then thinking yeah, they might have got a B. It's still an issue. But I think with grade boundaries starting to show where they're going to fall, that might help you when you do some diagnostic work with students in the future, but I would like to see them getting a good exam experience, it might be the last time they do

		<p>maths, I'd like them to be feeling that they can answer a lot of questions, but we will see.</p> <p>The other divide slightly, and I would love to get this at question level data but I'm finding this difficult is just to see how boys and girls do, because right at the top end we've seen more boys getting the grade 9s than girls, and a bit at the grade 8 as well, and then it settles down a bit more the same at the grade 7 and throughout, but top end it does seem to be the boys just getting a percent more of the grade 9s. And I suspect that that is a confidence issue, often the way that this whole GCSE has been a huge part of has been a confidence issue, and learning how to tackle questions and being prepared to tackle problem solving questions.</p>
Slide 41	Mock papers	<p>Well we've got, now I hope many of you might have seen an email from me yesterday that the mock set 3 are now available on the website, there is pdf, there are modified versions, there are mark schemes. We're hoping that you'll be able to use this over the next couple of months for your students. They have been looked at in the light of the summer exams, so we have reviewed next summer's exams and we have reviewed these mock papers to try and get past just a few issues that I've talked about that have come up in the summer to make sure that they don't repeat anything, that our ramping is good, that they're accessible to students in terms of language and what they're testing. So I think they are, they should be a good example I hope of what's coming next summer, I have seen the mocks, I haven't seen next summer's papers. We haven't reviewed November's papers that are coming next week, so I don't know what they look like, you know, I hope that they will be reasonable, but that's two sets of papers that are coming in quick succession. But I would use these mock papers as a sense of what students will see the next summer, and I hope you'll find them useful. I'm really hoping that they will stay secure and that people won't put them on websites or put answers up, sometimes there's just got to be some unseen papers out there. I know that the summer papers although you might want to use them as mocks are everywhere, we can't, we have to give up the struggle to some extent which is why we're producing mock papers now.</p> <p>We've done gold, silver, bronze versions of the summer questions as well, the problem solving questions, that's the ones where you put a little bit of structure in and that's to encourage students that they can do problem solving questions, maybe with a bit of help, maybe working up to it. So we've done a lot of those for past mock papers and specimen papers. Quite a few of those around, I think they are, they have been well worth using. And we have got the crossover questions as test papers. I'm always trying to think, and do send me your suggestions, trying to think of new ways that we might remix questions, maybe as topic tests or as themed tests, just different ways to approach them so that students approach different content in different ways perhaps and get used to the sorts of things that we examine.</p>
Slide 42	Resources	<p>We've got a large, you know, this is the emporium under the GCSE 1, MA 1, so we've got specimen papers, there are mock papers, you know, the various ones. We're not putting these current ones there at the moment because they can be a bit leaky, these cabinets, but there are practice papers and questions, that's where things like the themed ones will go. There's only one set of past papers at the moment but then November will be added into that. There's exemplification, there's schemes of work. Things like examiner reports and grade boundaries. Examiner reports, I've just put in some expanded examiner reports, they're about 120 pages but they're the question, mark scheme, assessment objectives, specification references, examiner reports, performance data, all in one place, so you can take one question and it just tells you everything we know about it essentially. So I hope that will be useful. There's other support materials and test, so there are different ways, more sort of topic tests and</p>

		things like that. So quite a lot that we've put in there, just looking at the assessment in different sorts of ways, which I hope you'll find useful.
Slide 43	Edexcel Maths team	<p>I'm coming to the end of my hour and a half, I've kept to my time quite well. This is what the Edexcel maths stream looks like tonight, that's Mark on the far right, that's probably me at the back, Rob on the left, Helen, Jo, Emily are in there somewhere. If you need to contact us we're always at mathsemporium@pearson.com, you can find us there to ask questions or give us any feedback that you want on the summer exams.</p> <p>I'd really like to thank Mark cause I know that he's been answering questions in the background. I will finish now and thank you very much, I'll say I will be around if you've got any questions for me that you want to type in, we'll stay and answer any that haven't been done. I wish you a happy Halloween, I'm going to stay indoors with the lights off in case any kids come knocking on the door, but I wish you a very good evening and thanks for joining this webinar.</p>