

#mathscpdchat 25 April 2023

What will you be doing later this term with your Y11 students who are planning to start on A level Maths in September? Hosted by Matt Man

This is a summary of the discussion - to see all the tweets, follow the hashtag **#mathscpdchat** in Twitter



The links shared during this discussion were:

<u>Preparing Year 11s for A level Maths</u> which is a blog by <u>Matt Man</u> related to a conference workshop, planned and delivered by him, in which he guided participants in exploring GCSE Maths topics and A level Maths topics, and comparing them. In this blog you will find the slides and handouts of the workshop session. It was shared by <u>Matt Man</u>

<u>Curriculum Priorities</u> which is the first of two recent (April 2023) posts, by <u>mathsjem</u> on her *Resourceaholic* website, about the present UK mathematics curriculum. She addresses the challenge of finding ways 'to squeeze our massive curriculum into limited contact time'. It was shared by <u>Matt Man</u>



<u>Reducing Curriculum Content</u> which is the second of two recent (April 2023) posts, by <u>mathsjem</u> on her *Resourceaholic* website, about the present UK mathematics curriculum. She writes about curriculum reform and what she sees as 'some opportunities to make changes in maths when the time comes'. It was shared by <u>Matt Man</u>

<u>Very Old Exam Papers: A Level Files</u> which is a page on <u>Mark McCourt</u>'s website where you will find copies of 1970 A level Maths exam papers which are free to download. It was shared by <u>Matt Man</u>

<u>Corbettmaths: Level 2 Further Maths</u> which is a collection of examples of Further Maths exam-style items ('problems'/'questions') organised by general topic (such as 'Number') and then more-specific topic (such as 'Product Rule for Counting'). For each more-specific topic there is a video in which the solution of a problem is demonstrated (worked-through), some 'practice questions' and 'answers'. It was shared by <u>Matt Man</u>

<u>GCSE to A Level Transition</u> which is the page on <u>Colleen Young</u>'s *Mathematics, Learning and Technology* website from which you can reach many various websites and resources (including material from the AMSP) to support GCSE to A level Maths transition. It was shared by <u>Colleen Young</u>

<u>AQA Level 2 Further Maths</u> which is an item on <u>Colleen Young</u>'s *Mathematics, Learning and Technology* website. It includes links to the 'Teaching Guidance' provided by AQA for their Level 2 Further Maths specification. Worksheets and mark schemes for each section of the specification are available. It was shared by <u>Colleen Young</u>

Key Ideas in Teaching Mathematics: Research-Based Guidance For Ages 9-19 which is a book by Anne Watson, Keith Jones and Dave Pratt. They provide research-based guidance, explanations and examples of the ideas that really matter for students from age 9 to 19, and that can be obstacles to future learning. It was shared by Mary Pardoe

<u>Forty Harder Problems for the Classroom</u> which is a book by Derek Ball from the Association of Teachers of Mathematics (ATM). It is a collection of challenging mathematical problems suitable for anyone over the age of 11 who enjoys thinking about non-routine problems. It was shared by <u>Mary Pardoe</u>

<u>Webmaths: KS5 Maths</u> which is a page of a website containing very many resources for KS5 maths teaching and learning. From there you can reach some of the sites listed below ... and many more. For example, you can reach a variety of Geogebra apps, some MEI sites, the websites of <u>Rob Southern</u> and <u>Susan Whitehouse</u>, and <u>Underground Maths</u>. It was shared by <u>webmathscouk</u>



<u>Year 11 lockdown course</u> which is a maths course written by <u>Paddy MacMahon</u> in 2020 for Year 11 pupils at Latymer Upper School in order to prepare them for A level Maths. It was shared by <u>Paddy MacMahon</u>

<u>A/AS Level Maths Preparation</u> which is a sheet of 'questions' devised by <u>Paddy MacMahon</u> that 'should only require GCSE knowledge, together with a willingness to think'. It was shared by <u>Paddy MacMahon</u>

<u>A Level Further Maths Preparation</u> which is another sheet of 'questions' devised by <u>Paddy MacMahon</u> that 'should only require GCSE knowledge, together with a willingness to think'. It was shared by <u>Paddy</u> <u>MacMahon</u>

An illustrated summary of the discussions in this #mathsCPDchat follows.



Earlier in the day there had been a reply to this tweet ...



mathscpdchat @mathscpdchat · Apr 25 Join #mathscpdchat TONIGHT at 7-8 pm!

Discuss issues relating to students' transition to A level Maths after GCSE!

Share with host, Matt Man, @mr_man_maths, and others, kinds/sources of support. What facts about the students do you need to consider when planning/selecting them?

... which was this:

resources.



Colleen Young @ColleenYoung · Apr 25

In case it's useful - I have checked my page on GCSE to A Level Transition

colleenyoung.org/a-level-16/gcs... #mathscpdchat

My turn		Your turn
My Lum		Tour turn
Simplify V50 by writing it in the f	form	Simplify v32 by writing it in the form
a where b is prime. State the va	aiues	of a and b
or a and b.	1' + L	0 2 810 0.
	F = 4 F = 9	
√50 = √25×2	e" - 18 1' - 28	$\sqrt{32} = \sqrt{16x2}$
= 125 12	9 - 28 7 - 48	- JIG J2
	1 - 84	- 412
= 512	77 - 180	
	11" = 121 12 ² = 144	17-6
(a=5)	11 ² = 100	[1-2]
()	14" = 196	(b=2)

The host's reply to Colleen, which he posted during the chat ...



Matt Man @mr_man_maths · 16h Replying to @ColleenYoung and @mathscpdchat

As always, can count on you Colleen, these resource links are amazing. Many thanks! #mathscpdchat

... prompted the following response:



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webmathscouk @Dids31 · Apr 25 Replying to @ColleenYoung @mathscpdchat and @mr_man_maths A few transition links on this page here as well webmathscouk.wordpress.com/ks5-maths/ #mathscpdchat

> webmathscouk.wordpress.com KS5 Maths KS5 Dropbox Link AS Past Paper Calendar 2023 A2 Past Paper Calendar 2023 Standards Unit ...

Although in most #mathsCPDchats all the replies and discussions are generated by the host's main questions, on this occasion the host's welcome tweet ...



Matt Man @mr_man_maths · 16h

Good evening everyone and welcome to tonight's **#mathscpdchat** discussion on Year 11 students transitioning to start A Level Maths in September. Standby for the first question

... prompted two conversations. This one was started by an enigmatic short reply to it:



JustMaths @Just_Maths · 17h easy one ... letting you, Cat and Andy do it!



Matt Man @mr_man_maths • 17h

Replying to @Just_Maths

Hahahaha Mel! Actually groupings are important in transitioning from Year 11 to Year 12? #mathscpdchat



Matt Man @mr_man_maths · 17h

Just to put into context for those that do not know.

In the school that I'm at now, A Level Maths teachers are involved heavily in teaching either Set 1 or Set 2 in Year 11. This is to allow consistency and a flow going from Year 11 to Year 12 to avoid the shock. #mathscpdchat



Heather Pehrson @pehrson_heather · 19h

Same at my school. I previously taught at a sixth form only college and now being involved in the KS4 lead up to A Level is genuinely enjoyable. I constantly say, 'Next year in A Level Maths you'll see....' I've just decided to act like they'll all stay on!



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Matt Man @mr_man_maths · 19h

YES! I say this to all my groups and say that they are on a journey right up until sixth form. Not only promoting Maths but also the school to retain as many internal students as possible. #mathscpdchat



Matt Man @mr_man_maths · 19h

And fundamentally, as what @Just_Maths says to me all the time, it's the relationships that you build with the students. #mathscpdchat



Kerry Dunton @KerryDunton · 19h

Have you done this for long so have noticed a benefit? I used to have set 1 for a number of years but have now had set 3 for a few. It is definitely different for me when I don't know the y12 students so I guess it is for them too. We also have lots of externals who know no one!



Tom Bennison @DrBennison · 19h

I think this is vital really. It also helps massively with recruitment to A-Level. #mathscpdchat



Matt Man @mr_man_maths · 19h

Awesome to see other schools following our trend! How do numbers look and how do you select the students? #mathscpdchat



Tom Bennison @DrBennison · 19h

Numbers are looking good. Small sixth form but a decent further maths cohort. I'm a firm believer in individual selection and not just going on grades. My entry requirements are lower than most in the region and I get great results. #mathscpdchat



Matt Man @mr_man_maths · 19h

Yes, to make the pupils feel that they are not just a number. What would be the entry requirements for your school? And when do you allow exemptions? #mathscpdchat



Tom Bennison @DrBennison · 18h

Grade 6 for both further and "regular" A-Level maths. Letting a grade 5 student start A-Level maths is dependent on recommendations, I'll also sometimes set an algebra test at enrolment. If they are keen they will love doing that on results day ;)



Matt Man @mr_man_maths • 18h Wow, that's brave! #mathscpdchat



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Tom Bennison @DrBennison · 18h Which bit? #mathscpdchat



Matt Man @mr_man_maths · 18h The Grade 5 student. How successful are they? #mathscpdchat



Hannah Smith @HannahLSmithE · 8h The one Grade 5 Student I ever let on got an A* 😂

Matt replied to his own tweet shown next below (which was part of the conversation above) ...



Matt Man @mr_man_maths · 17h

Just to put into context for those that do not know. In the school that I'm at now, A Level Maths teachers are involved heavily in teaching either Set 1 or Set 2 in Year 11. This is to allow consistency and a flow going from Year 11 to Year 12 to avoid the shock. #mathscpdchat

by asking ...



Matt Man @mr_man_maths · 17h

Just wondering how does transition to A Level Maths work for you? @mrsouthernmaths @TLMaths @BicenMaths @KerryDunton @MathsSecondary @Sheena2907 @robotmaths @blatherwick_sam @BerwickMaths @DrBennison @PixiMaths #mathscpdchat

... to which (the next day) there was this reply:



RobotMaths 🥌 @robotmaths · 8h



dropbox.com GCSE to A Level Shared with Dropbox



Matt Man @mr_man_maths · 15h Replying to @robotmaths @Just_Maths and 10 others Legend @robotmaths! Great materials for transition to A Level Maths. #mathscpdchat

Also, this tweet from Tom Bennison (part of the conversation above) ...



Tom Bennison @DrBennison · 19h

Numbers are looking good. Small sixth form but a decent further maths cohort. I'm a firm believer in individual selection and not just going on grades. My entry requirements are lower than most in the region and I get great results. #mathscpdchat



... the next day prompted this reply/request:



sumsnstuff @sumsnstuff · 1h

Hi Tom. I'm really interested in finding out a bit more about your ideas for transition and supporting struggling students. I am an AMSP AC. Please could I pick your brains?

The other conversation (which was a branching thread of related discussions) generated by Matt's welcome tweet ...



Matt Man @mr_man_maths · 16h

Good evening everyone and welcome to tonight's **#mathscpdchat** discussion on Year 11 students transitioning to start A Level Maths in September. Standby for the first question

... was initiated by a reply to it from Sheena:



Sheena @Sheena2907 · 17h

Working at a trust level now I will be putting support and resources together to help prepare students and am writing a new scheme of work that focuses on the basics in the beginning to make sure the transition topics are really secure



Matt Man @mr_man_maths · 17h

Yes, I remember that when we did our joint MathsConf session together, we commented on how the importance of sequencing topics in Year 12 to ensure that students are not switched off right at the beginning. #mathscpdchat



Sheena @Sheena2907 · 16h

But there's a balance. Students have to know it's the right course for them too so can't be all GCSE transition



Matt Man @mr_man_maths · 16h Agreed! #mathscpdchat



Milena Lee 🥌 @MathsSecondary · 7h

We've been using the free @Integral_Maths transition resources for a couple (or 3 even?) of years now, core maths too. They are excellent and easily monitored, highly recommend...

Sheena's initial tweet above (about writing a scheme of work for A level Maths that 'focuses on the basics in the beginning') also prompted the following thread ...

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Tom Bennison @DrBennison · 17h

I think this is increasingly important. Seems to be a downward trend in confidence and proficiency with the basics over the last 5 years or so – I don't think it is just a pandemic thing.



Matt Man @mr_man_maths · 17h

Yes, it definitely has played a major factor into the decline of fluency of the basics. #mathscpdchat



Matt Man @mr_man_maths · 17h

Thinking about this further. I wonder why proficiency with the basics is seemingly going downhill. Is there too much content in the earlier KS2, KS3 or GCSE curriculum? Mind now goes to a few blog posts from @mathsjem #mathscpdchat



Matt Man @mr_man_maths · 17h resourceaholic.com/2023/04/curric...

and

resourceaholic.com/2023/04/reduci...

(links provided above)



Sheena @Sheena2907 · 16h

I think the pandemic impact is still being felt though. The confidence, social skills and maturity of the students coming through are massive issues #cpdchat



Matt Man @mr_man_maths · 16h

Yep, though it might be a general trend though and it could be that the pandemic was a catalyst for this? #mathscpdchat



Sheena @Sheena2907 · 16h

This is combined with the new spec where there's far too much content to cram in. That also has to be a factor. #mathscpdchat



Tom Bennison @DrBennison · 16h Comparing to 1970s A-Levrl papers is a bit depressing though!



Matt Man @mr_man_maths · 17h And here they are!emaths.co.uk/index.php/teac. #mathscpdchat

(link provided above)



	Sheena @Sheena2907 · 16h I wonder how much teaching time there was back then though. I feel like everything is being squeezed	••••
	Matt Man @mr_man_maths · 16h Or guided curriculum hours? #mathscpdchat	•••
	Sheena @Sheena2907 · 16h Entry requirements too. I would genuinely be interested to know #mathscpdchat	••••
	Maryse @AllThingsMaths · 17h And class sizes.	•••
	Matt Man @mr_man_maths · 16h Let's run a poll! I'll do it in a separate tweet #mathscpdchat	••••
and She	eena's initial tweet above (about writing a scheme of work for A level Maths that	
'focuses o	on the basics in the beginning') also prompted this:	
¥.	Kerry Dunton @KerryDunton • 17h in short, not as well as I would like it to! We have tried various different things but I'm not sure we're getting it right. Trouble is, the needs vary so much. A grade 6 student needs something very different to a grade 9 student.	о
	Milena Lee 🥌 @MathsSecondary · 7h	
	Again, the @Integral_Maths resources are fantastic for that, although ou entry requirement is 7	1r
	Matt Man @mr_man_maths · 17h Yes, and the grade boundaries for the GCSE papers show. A grade 6 student might not face a lot of the core skills required to do the first part of A Level Maths. That has happened to a few of my current Year 12s. #mathscpdchat	••••
Ċ	Sheena @Sheena2907 · 17h Agreed! Looking at the breakdown of where students got their marks is s important in advising students on whether maths is right for them #mathscpdchat	50

To Matt's welcome message there was also this 'single' reply (that did not result in a discussion as did both Mel's [Just Maths's] and Sheena's replies):



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The host commented, during the Sheena-generated conversation above, ...

100	- have		
	127	12	
100	100	100	

Matt Man @mr_man_maths · 16h ···· Let's run a poll! I'll do it in a separate tweet #mathscpdchat

... and this poll appeared several minutes later:



Matt Man @mr_man_maths · Apr 25 What are the entry requirements for A Level Maths at your school? #mathscpdchat

7	60.2%
6	31.8%
5	1.8%
Other (please comment)	6.3%

620 votes · Final results

This poll-tweet prompted a short conversation plus several single comments. A question from Sam started the conversation ...



Sam Blatherwick @blatherwick_sam · Apr 25 ···· Follow up to this should be where was your entry criteria on old gcse and if you've moved from B to a 7 then why?



Matt Man @mr_man_maths · Apr 25 ··· That's a great question and worth considering why it has got up as such. #mathscpdchat





Westie's Workshop @westiesworkshop · 15h

Not sure this fully answers the q but worth mentioning. I like showing this from the emporium to give y11 full clarity of likely outcomes. From only non-covid affected cohort. Anything less than a 8 likely to result in a B or less even with hard work.

	6 - O.	26	G	ICSE 1M	IA1 Yea	ır 11 Ju	une 20	17 Grad	es			
		U	1	2	3	4	5	6	7	8	9	TOTAL
	U	0	1	2	1	9	92	375	357	66	4	907
	E	1	1	0	1	10	72	684	1483	584	32	2848
GCE	D	0	1	2	4	5	60	632	2339	1441	136	4620
grades	с	0	0	3	6	1	23	369	2185	2597	421	5605
June 2019	В	0	0	2	4	8	15	149	1316	3003	887	5383
	А	2	2	3	2	11	13	70	755	3517	2925	7300
	A*	1	0	3	10	12	6	12	84	884	3540	4552
	TOTAL	4	5	15	28	56	281	2291	8519	12071	7 9 45	31215



Matt Man @mr_man_maths · 14h

Yes, the image that Pietro Tozzi mentioned from his previous workshops on transition to A Level Maths. Thanks for sharing again @westiesworkshop! #mathscpdchat

... and these were the 'single' replies to the poll-tweet:



Em Tee @EmT_Maths · Apr 25

I worked somewhere where it was a 5 for maths, 6 for FM. Start of September, the enrolment interviews were done by any senior staff and someone had enrolled two students with 5's who had foundation GCSE as they didn't know about the different tiers for maths! 2



Andrew Parry 🖸 @okimaths · Apr 25 7 but with just a 7 they find it hard.



Lynne Davis @B28MathsTutor · 21h

SLT at my old 6FC insisted on accepting 6s (bums on seats for funding) but we'd check their algebra where possible and if it wasn't up to scratch then we'd try to steer them to other subjects.

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Paddy MacMahon @paddymac_maths · Apr 25 8 for A level maths, 9 for FM. But there's some blurring at the edges: ultimately any pupil at the school who really wants to do a subject can.



William Feltham @WilliamJFeltham · Apr 25 We ask for a grade 7 but will accept grade 6 with a teacher

recommendation.

We've found that if we ask for a 6 straight off then we get students who have scraped a 6 and aren't up to the right basic standard.



Georgina Wallace-Northridge @misswwmaths · Apr 25 We have lowered ours this year from 7 to 6 so we were in line with other local 6th forms. I would take a hard working 6 than a lazy 7/8 any day.



Rose Procter @Rose_Rover · Apr 25 7 officially but 2 in my class only have grade 6.....



Tom Brown @mathsgeekuk · Apr 26 8 or 9



Heather Pehrson @pehrson_heather · Apr 25

I was a firm believer in the 7 boundary but moved to a new school this year and have a Y13 who got grade 6 in GCSE. He's flying! Predicted A*. I know that's very unusual but it has changed my mind about giving them a shot. Especially as a 4th subject.



Em Tee @EmT_Maths · Apr 25

I inherited a further maths class half-way through their y12 where one had a 6. She got a B in the end – unusually better than her maths grade which was a C. They have to have the right work ethic but it's definitely doable if they really want to do it.

Matt also tweeted a poll about the typical number of students in A level Maths classes ...



	Matt Man @mr_man_maths · Apr 25	
	What are your class sizes for your A Level group? You may have more than one group, if so, put it on the comments. #mathscpdchat	
	31+	2.2%
	21 to 30	33.6%
	11 to 20	47.2%
	1 to 10	17%
	229 votes · Final results	
which p	Matt Man @mr_man_maths • Apr 25 I have at the moment: 5 and 12 for 2nd year. 14 and 14 for 1st year.	
	Jack Brown @TLMaths · Apr 25 We have 24 1st year classes and 19 2nd year classes.	•••
NOT ALL WETH TONIA AND TEMMER. JUST SEM	Mr CF @MrCFMaths · 18h 24 actual classes or 24 in a class?	
	Jack Brown @TLMaths · 16h 24 actual classes	
Est	Sam Blatherwick @blatherwick_sam · Apr 25 22 and 18	
Est	Sam Blatherwick @blatherwick_sam · Apr 25 Highest in our school is 29 currently	
R	Ravenmaths @ravenmaths · Apr 25 Groups I teach are 24 in year 12, 19 and 14 in year 13	•••





Hannah Smith @HannahLSmithE · Apr 26 5 and 4 :(but our sixth form only has 13 and 9 pupils on respectively 4 and 3 do core maths as well



Hannah Smith @HannahLSmithE · Apr 26 Weirdly we have 2 and 2 for further maths as well

The replies to Matt's first main question ...



Q1:

Matt Man @mr_man_maths · 16h

As we approach the business end of the year with GCSE exams coming up, how are you going to prepare your Year 11 students for A Level Maths and/or Further Maths in September? #mathscpdchat

... formed a two-way conversation and a short thread about a particular resource. In the conversation some resources were mentioned:



Colleen Young @ColleenYoung · 16h

I now work with distance learning students. We have a self- marking transition quiz. References are made to specific resources from Edexcel's Transition materials if they have problems with any questions. #mathscpdchat



Matt Man @mr_man_maths · 16h

Oh, distance learning? Is that via the @Advanced_Maths network? #mathscpdchat



Colleen Young @ColleenYoung · 16h

No, distance learning colleges. We do get students doing Further Maths as their schools no longer offer this. So they do 3 A Levels at school and add Further Maths as a distance learner. Or it may be a second chance for students trying to improve a grade. #mathscpdchat



Matt Man @mr_man_maths · 16h

Ah I see. Are there many distance learning colleges around? #mathscpdchat ...

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Colleen Young @ColleenYoung · 16h There are. Not that many seem to offer Further Maths A Level. #mathscpdchat.



Matt Man @mr_man_maths · 16h

And I guess that's where @Advanced_Maths get involved! Personally, I did Further Maths via the old FMSP by the former area coordinator from Oxfordshire. He was brilliant and inspired me to continue the trend to develop the next generation of mathematicians. #mathscpdchat



Matt Man @mr_man_maths · 16h

Just wondering @ColleenYoung - which transition quiz do you use and when during Year 12 do you use them? #mathscpdchat



Colleen Young @ColleenYoung · 16h

The quiz I mentioned is for students starting the A level course. They are very much encouraged though to use the Edexcel transition resources throughout the first year of the course and I use them in our seminars. #mathscpdchat



Matt Man @mr_man_maths · 16h

That sounds great. How long is the quiz? Is it multiple choice? Is it done online or paper? #mathscpdchat



Matt Man @mr_man_maths · 20h pearson.com/uk/educators/s.

And these are the resources that @ColleenYoung is referring to. #mathscpdchat

(Link provided above.)

The resource suggested in response to Matt's Q1 ...



Matt Man @mr_man_maths · 16h O1:

As we approach the business end of the year with GCSE exams coming up, how are you going to prepare your Year 11 students for A Level Maths and/or Further Maths in September? #mathscpdchat



... is a book:



Mary Pardoe @PardoeMary · 16h

There is some very useful/helpful advice in the last chapter of 'Key Ideas in Teaching Mathematics' by Anne Watson et al ... here: amazon.co.uk/Key-Ideas-Teac... #mathscpdchat

> Moving to mathematics beyond age 16

Introduction

This chapter illustrates that as students make the transition to mathematics beyond the age of 16 their mathematical experiences need to bring together the range of mathematical ideas encountered earlier on in their mathematical career; in other words, the ideas covered in the earlier chapters in this book The new mathematical ideas encountered in the years beyond age 16 include, amongst other things, trigonometric functions, calculus and analysis, and statistical inference. These are amongst the topics that are at the heart of what is sometimes called 'higher' or 'senior' mathematics (leading to 'advanced' or 'formal' mathematics; see Edwards et al., 2005; Tall, 1991, 2008). It is these topics that are addressed in brief in this chapter; a fuller treatment would need a whole new book.

As an example of what is involved in bringing together mathematical ideas. Watson (2009a, p. 5) uses the example of the topic of trigonometry to argue that:

Robust connections between and within earlier ideas can make it easier to engage with new ideas, but can also hinder if the earlier ideas are limited and inflexible. For example, learning trigonometry involves understanding the definition of triangle; right-angles; recognizing them in different orientations; what angle means and how it is measured; typical units for measuring lines; what ratio means; similarity of triangles; how ratio is written as a

200 | KEY IDEAS IN TEACHING MATHEMATICS





Mary Pardoe @PardoeMary · 16h This book ... #mathscpdchat

OXFORD Koy Ideas In Teaching Mathematics Research-based guidance for ages 9-19 Anne Watson Keith Jones Dave Pratt



Dr Laurie Jacques (she/her) @SmartJacques · 18h Great book ... it's been a while since I opened mine! @NuffieldFound @KeithJonesUoS @NCETM @ATMMathematics @LearningMaths @KandMMathsHub



The host's second question ...



Matt Man @mr_man_maths · 21h

Let's keep the discussions coming in on transition to A Level Maths. Q2:

How will you ensure that the Year 11 prospective Maths / Further Maths students are better prepared for A Levels in September and ensure that any gaps of prior knowledge of topics are closed? #mathscpdchat

... prompted the sharing of this resource ...



Paddy MacMahon @paddymac_maths · 19h We require them to do some prep over the holiday, in preparation for the first few topics on the schemes of work:

Single:drive.google.com/file/d/1q8PfRH..

Further: drive.google.com/file/d/1qAStvp..

#mathscpdchat



drive.google.com new_sixth_fm.pdf

... these comments ...



Solihull Maths Revision @DavidParman1 · 3h

...

With hardly any students sitting the AS exam I'd like to see a two year curriculum that wasn't constrained by the AS/A2 specs. Nearly 50 years ago my A Level course started with arithmetic and geometric series. I still think this would be a great starter for year 12 today.



Matt Man @mr_man_maths · 15h Replying to @DavidParman1

Absolutely, perhaps a great taster activity for prospective Year 12 students? #mathscpdchat

... the following long conversation ...





Maryse @AllThingsMaths · 21h

We've brought back Further Maths GCSE and we're making explicit links and sewing seeds for the time ahead.

Also securing the key skills e.g. fluency and depth in quadratics.

#mathscpdchat



Matt Man @mr_man_maths · 21h

Yes! Further Maths GCSE / Level 2 seems to be a qualification that a few schools go for. I do want to thank @Just_Maths for helping our current Year 11s with this. The students love it. #mathscpdchat



Maryse @AllThingsMaths · Apr 25

It's cementing our GCSE 8s and 9s and bringing in some fab problem solving. (I know I should be doing that anyway).

It's especially lovely when I have 12s and 10s after each other and the 10s recognise some of what the 12s are doing.



Matt Man @mr_man_maths · Apr 25

Bingo! That's when we sow seeds right from the start and encouraging the younger students to know that they do develop skills that are involved in both GCSE and A Level. #mathscpdchat



Matt Man @mr_man_maths · 21h

Fluency - yes that's a common theme that I do believe some of our current A Level students seem to struggle. For example, my colleague was mentioning how about divide cos(x) by cos(x) gives x. Still lots of misconceptions. #mathscpdchat



Maryse @AllThingsMaths · 21h

Ditto. There's been a loss in the deep exploration of some of the topics. We spent a lesson (12s) just playing with trig functions. We spent another playing with functions to show WHY and HOW transformations happen.

#mathscpdchat



Matt Man @mr_man_maths · 21h

Lovely! I think that is the problem that sometimes we assume that they are Set 1 for example, that we teach for breadth instead of depth? That's something that I've been changing recently especially with my top set in Year 10 as an example. #mathscpdchat

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Maryse @AllThingsMaths · 21h

I hate to mention the old covid thing but... had an impact. We've also switched our KS3 curriculum to better prepare for growth over their 5 years. Y10 is the first Yr who've gone through that.

#mathscpdchat

Matt Man @mr_man_maths · 21h

Sounds good Maryse! What things did you change in your KS3 curriculum to allow better growth for the next five years? #mathscpdchat



Maryse @AllThingsMaths · 21h

Just the basics. Core numeracy skills secure. Lots of reasoning questions. Ensuring staff know the maths ahead so we plan little seeds. Making the links so maths is a living, breathing thing. I've shown some Y12 questions to Y10 to show how they CAN do A Level. #mathscpdchat



Matt Man @mr_man_maths · Apr 25

Love it! I do that too. I think what this shows is how important it is for us as Maths teachers in being fluent and confident in not just for example the KS3 and KS4 curriculum, but also A Level. #mathscpdchat



Maryse @AllThingsMaths · Apr 25

Definitely. And we need to support non specialists with this who may end up teaching maths.



Matt Man @mr_man_maths · Apr 25

Yep, whether it's developing GCSE knowledge or A Level knowledge. #mathscpdchat



Maryse @AllThingsMaths · 21h

And raising expectations of staff and students. Also we're looking at EY, KS1&2 as part of this. Seeing what the students have done prior to 2ndry. More students on higher GCSE too. #mathscpdchat



Matt Man @mr_man_maths · 21h

Absolutely! The transition from primary to KS3 is crucial. For example, simultaneous equations makes an appearance in the SATs papers and that is in GCSE and A Level. I'll be doing a workshop for #mathsconf32 @LaSalleEd where I discuss this further. #mathscpdchat

When Colleen replied to Maryse's comment (about having brought back Further Maths GCSE, and repeated again immediately below) that started this long conversation, a contributor was prompted to share the link to a resource.





Maryse @AllThingsMaths · 21h

We've brought back Further Maths GCSE and we're making explicit links and sewing seeds for the time ahead.

Also securing the key skills e.g. fluency and depth in quadratics.



Colleen Young @ColleenYoung · 21h

That's a good idea. I have done that when teaching the Further Maths GCSE #mathscpdchat

Maryse @AllThingsMaths · 21h



I'm really enjoying teaching it. We looked at sequences this week and it's fab how the Maths feeds into the FM. Some lovely questions. Great thinking and reasoning.

Mary Pardoe @PardoeMary · 21h

Have you seen this book from @ATMMathematics Maryse. I think there are some problems in it that your students would enjoy? It's here atm.org.uk/Shop/Forty-Har...

#mathscpdchat



Forty Harder Problems for the Classroom, Book

This collection of challenging mathematical problems is suitable for anyone over the age of 11 who enjoys thinking about non-routine problems. Written by Derek Ball. KS3, KS4 & KS5. Available from £10.50.



Some of the problems use content met in the first year of key stage 3, but you have to keep your head and use quite a lot of imagination if you are going to solve them. Others require mathematical facts and skills met at a later stage and yet might be relatively more straightforward to tackle. For example, the second part of the very last problem invites the solver to prove a result using integral calculus; yet the first part could be tackled by key stage 3 pupils who can think laterally.





Maryse @AllThingsMaths · 21h Bookmarked. Thank you.

Mary Pardoe @PardoeMary · 21h This is a page from it ...

#mathscpdchat

Sugar boxes

A manufacturer packages his 1 kg bags of sugar in large cardboard boxes. Each box has sides in the ratio 9:6:4.

If the sugar was packed in boxes of the same size but cubical he would save on cardboard.



Find the ratio of the areas of cardboard needed for each of the boxes.

Congruent pieces of a triangle

Draw a row of equilateral triangles about 4cm high.



Split the first triangle into two congruent triangles and the second into three congruent triangles.

Can you split the others into 4, 5, 6 ... congruent triangles up to 12 or more?

Are there some that do not work? Can some of the triangles be split in more than one way? Would any of your methods work starting from one general triangle?

Try to find a systematic method to enable you to predict, for example, whether the triangle can be split into 24, or 25, or even 48 or 49 congruent triangles without having to draw the whole figure.

Are any of these possible starting from a general triangle?

Divisibility by 9

874539÷9=

a, b and c represent the three digits, in that order, of the 3-digit number n. What is the value of n, in terms of a, b, c?

Show that if a + b + c is divisible by 9, then n is also divisible by 9.

Write down the converse of the statement and find out if it is true.

Do you get the same result with a 4-digit number?



Matt Man @mr_man_maths · 21h ···· Divisibility by 9 - a perfect resource in introducing number theory. That is in Edexcel FP2. #mathscpdchat

ncetm.org.uk | 23

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This (repeated next below) tweet from Maryse prompted Matt to ask to see some example problems, which Maryse then provided, and which led to the sharing of more links to resources.



Maryse @AllThingsMaths · 21h

I'm really enjoying teaching it. We looked at sequences this week and it's fab how the Maths feeds into the FM. Some lovely questions. Great thinking and reasoning.



Matt Man @mr_man_maths · 21h

Yes, the questions from the GCSE Further Maths papers are just brilliant. #mathscpdchat



Matt Man @mr_man_maths · 21h

Just thinking @AllThingsMaths - are you able to provide some questions which are in your opinion lovely and can provide inspiration for pupils to do A Level Maths / Further Maths? #mathscpdchat



Maryse @AllThingsMaths · 21h On my phone so a bit hard but picked these out.

Maryse @AllThingsMaths · 21h

Question 3 because they realised how easy it was if you considered numerator then denom.

Question 4 because it led to some lovely verbal reasoning to pick out what actually matters as n tends to infinity.

#mathscpdchat



Write down the nth term for the sequence

4. The nth term of a sequence is $\frac{2n+1}{3n-5}$

Write down the limiting value of the sequence $n \rightarrow \infty$



Matt Man @mr_man_maths · 21h Beautiful! #mathscpdchat

...

...





Maryse @AllThingsMaths · Apr 25

We've hammered algebraic fractions and quadratics so this was a thing of beauty. It just falls out. All the dead weight falls away and it just works itself out. It's the application of the skills we've been learning.

#mathscpdchat

10. The nth term of sequence A is $\frac{n+2}{2n-3}$

The nth term of sequence B is $\frac{3n-14}{n+5}$

The qth term in sequence A is the same as the qth term in sequence B.

Work out the value of q



Matt Man @mr_man_maths · Apr 25

...

...

Beautiful! And really love the resources that @Corbettmaths has created on Level 2 Further Maths.

Link here:corbettmaths.com/more/further-m... #mathscpdchat

	Solving Problems <u>Video</u> <u>Practice Questions</u>
	Sketch curve knowing maxima/minima <u>Video</u> <u>Practice Questions</u>
	Matrices
	Multiplying Matrices (by a scalar) <u>Video</u> <u>Practice Questions</u>
	Multiplying Matrices (2×2 by 2×1) Video Practice Questions
	Multiplying Matrices (2×2 by 2×2) <u>Video</u> <u>Practice Questions</u>
(corbettmaths.com
ł	Further Maths
1	videos and worksheets for Level 2 Further Maths
	(Link provided at top of summary)



...



Maryse @AllThingsMaths · Apr 25 This is where I nabbed these!



Colleen Young @ColleenYoung · Apr 25

Agreed re @Corbettmaths, the Further Maths resources are excellent. #mathscpdchat



Colleen Young @ColleenYoung · Apr 25 ···· ...and have you seen the resources from @1stclassmaths? And Careless Casey from @andylutwyche

- 6	2(a)	f(1) = 1 + 2 - 5 - 6 = -8
(1) and f(1)		f(-1) = -1 + 2 + 5 - 6 = 0
(1) and 1(-1)	2(b)	f(2) = 8 + 8 - 10 - 6 = 0
(2) and f(-2)		f(-2) = -8 + 8 + 10 - 6 = 4
(3) and f(-3)	2(c)	f(3) = 27 + 18 - 15 - 6 = 2
the three linear factors of $f(x)$.		f(-3) = -27 + 18 + 15 - 6 =
	2(d)	(x + 1), (x - 2) and (x + 3)

colleenyoung.org

AQA Level 2 Further Maths

Return to Examination Board Teaching Resources. This level 2 qualification is designed to stretch and challenge students who are ... (Link provided at top of summary)



Matt Man @mr_man_maths · Apr 25 I haven't yet, but they look great, thank you Colleen! #mathscpdchat



Andy Lutwyche @andylutwyche · Apr 25 Cheers Colleen

Matt's request to Maryse to see some example problems (repeated next below) prompted another contributor to share some.



Matt Man @mr_man_maths · 21h

Just thinking @AllThingsMaths - are you able to provide some questions which are in your opinion lovely and can provide inspiration for pupils to do A Level Maths / Further Maths? #mathscpdchat

...





Paddy MacMahon @paddymac_maths · 20h

Some nice series problems, which (with a bit of inspiration) can be solved in much the same way that GCSE students convert recurring decimals to fractions:

#mathscpdchat

Find the value of:

1.
$$\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{243} + \frac{1}{729} + \dots$$

2. $\frac{1}{3} + \frac{2}{9} + \frac{3}{27} + \frac{4}{81} + \frac{5}{243} + \frac{6}{729} + \dots$
3. $\frac{1}{3} + \frac{3}{9} + \frac{5}{27} + \frac{7}{81} + \frac{9}{243} + \frac{11}{729} + \dots$
4. $\frac{1}{3} + \frac{4}{9} + \frac{9}{27} + \frac{16}{81} + \frac{25}{243} + \frac{36}{729} + \dots$
5. $\frac{1}{3} + \frac{1}{9} + \frac{2}{27} + \frac{3}{81} + \frac{5}{243} + \frac{8}{729} + \dots$



Matt Man @mr_man_maths · 20h Beautiful! Thank you Paddy! #mathscpdchat

...

That is the end of the long discussion generated by Maryse's reply (about bringing back GCSE Further Maths) to Matt's second main question of the chat. But four shorter conversations were also generated by the host's second question, which is repeated here as a reminder of what it was:



Matt Man @mr_man_maths · 21h

Let's keep the discussions coming in on transition to A Level Maths. Q2:

How will you ensure that the Year 11 prospective Maths / Further Maths students are better prepared for A Levels in September and ensure that any gaps of prior knowledge of topics are closed? #mathscpdchat



There was a short exchange about providing a booklet of problems for students who are going on to A level Maths to tackle at the end of Y11 ...



Neil "not Santa" Eley 🙋 🚹 @neileley · Apr 25

Loads of practice quadratic questions Hard Simultaneous Equations Function transformation Sine and Cosine rule questions.

They need to use it or they lose it.

Must be a website that does this ?



Matt Man @mr_man_maths · Apr 25 There should be, would @Corbettmaths be the closest to offer? #mathscpdchat



Neil "not Santa" Eley 🙋 🚹 @neileley · Apr 25

When I taught A level many years ago - I produced a booklet for students who wanted to do A level - offered support for students who wanted it - but expected the majority of booklet to be completed. Algebra and Trig fluency was an absolute must have.

... and this ...



Solihull Maths Revision @DavidParman1 · 18h ···· With hardly any students sitting the AS exam I'd like to see a two year curriculum that wasn't constrained by the AS/A2 specs. Nearly 50 years ago my A Level course started with arithmetic and geometric series. I still think this would be a great starter for year 12 today.



Matt Man @mr_man_maths · 9h Absolutely, perhaps a great taster activity for prospective Year 12 students? #mathscpdchat

... and this conversation about another possible way to help students prepare for starting on an A level Maths course ...



Adam Goodridge @AdamGoodridge18 · Apr 25 We have GCSE Stats and Additional Mathematics as a joint option for KS4.





Matt Man @mr_man_maths · Apr 25

A joint option? Ohhh... that's interesting Adam. Additional Mathematics meaning the one offered by @AQAMaths or the FSMQ offered by @OCR_Maths? #mathscpdchat



Adam Goodridge @AdamGoodridge18 · Apr 25

OCR. Yes, it has been very successful so far. We transitioned from offering GCSE Stats to our most able mathematicians as a weekly after school session to having the joint option. Our year 12s (our first joint cohort) have statistically been our highest performing cohort to date



Matt Man @mr_man_maths · Apr 25 Oh, something to consider. Thank you Adam! #mathscpdchat



Adam Goodridge @AdamGoodridge18 · Apr 25 Happy to answer any questions you have about it

... and this discussion, in which another link (provided above) was shared, and an interesting possibility was considered, was in response to Matt's second question:



Paddy MacMahon @paddymac_maths · Apr 25

During the first lockdown (no exams, no y11 study leave) I and colleagues developed the course below. Guiding principle was extension without covering actual A level work. But lots of practice at key skills, and some very interesting topics.



paddymacmahon.com

paddy macmahon - year 11 lockdown course I wrote this course in 2020 for Year 11 pupils at Latymer Upper School. The national lockdown ...



Matt Man @mr_man_maths · Apr 25

Oh, I haven't seen this Paddy, so will be bookmarking this. Thank you for sharing – it looks great! #mathscpdchat



Paddy MacMahon @paddymac_maths · Apr 25

You're very welcome! Still use bits and pieces from it, and if we ever lose GCSEs it'll make a useful bridging course.



Matt Man @mr_man_maths · Apr 25

Now that would be interesting! It kind of is like that in Hong Kong, where there were versions of their GCSE and A Level, but scrapped it and changed it to a more "IB" style qualification. #mathscpdchat

....





Matt Man @mr_man_maths · Apr 25

Though I would wonder what the curriculum would look like if say GCSEs were not around. But that is a very deep topic to discuss. #mathscpdchat Paddy MacMahon @paddymac_maths · Apr 25 ····

Indeed. But there is talk in some quarters of moving away from public exams at 16: @rethinkassessmt

Towards the end of the chat the host posted three tweets that were not questions or replies. In the following one of these three informative tweets from the host the four images that are attached to his <u>quoted tweet</u> have been enlarged for clarity:



Matt Man @mr_man_maths · Apr 25

...

...

This is what I tweeted last year and commenting on how important it is for the students to be fluent in the topics listed below for both GCSE and A Level. #mathscpdchat

🚯 Matt Man @mr_man_maths · Jun 25, 2022

Quite a few people were asking about the "Crossover" between GCSE and A Level.

Here are the topics that I shared at both #MathsConf28 and #MathsConf29.

Can anyone else think of any topics that cross over between GCSE and A Level?

Topic No	Topic	A Level spec	GCSE spec
	Year 12		
1	Proof (by deduction and counterexample)	A1	A6
2	Laws of indices	B1	N7
3	Simplifying surds	B2	N8
4	Surds (Four operations)	B2	N8
5	Rationalising the denominator	B2	N8
6	Factorising quadratics	B3	A4
7	Solving quadratic equations (Factorising)	B3	A4
В	Completing the square	B3	A4
9	Quadratic formula	B3	A4
10	Quadratic graphs	B3	A11
11	Simultaneous equations (linear)	B4	A19
12	Simultaneous equations (linear and quadratic)	B4	A19
13	Simultaneous equations (graphs)	B4	A19
14	Solving linear inequalities	B5	A22
15	Solving quadratic inequalities	B5	A22



@mr_man_maths

Preparing GCSE Pupils for A Level Maths

CROSSOVER!



CROSSOVER!

Topic No	Торіс	A Level spec	GCSE spec
	Year 12		
16	Inequality regions	B5	A22
17	Expanding triple brackets	B6	A4
18	Sketching cubic graphs	B7	A12
19	Sketching reciprocal graphs	B7	A12
20	Transformations of graphs (Translation)	B9	A13
21	Transformations of graphs (Reflection)	B9	A13
	Equation of a straight line	C1	A10
F	Parallel and perpendicular lines	C1	A9 🔿
24	Equation of a circle and equation of tangent to a circle at a given point	C2	A16
25	Sine rule	E1	G22
26	Cosine rule	E1	G22
27	Area of a triangle (non right angled)	E1	G23
28	Trigonometric graphs	E3	A12
29	Solving trigonometric equations using graphs	E7	A12
30	Sketching exponential graphs	F1	A12

Preparing GCSE Pupils for A Level Maths

			CROSSOVER!
Topic No	Торіс	A Level spec	GCSE spec
	Year 12		
31	Estimating gradient of graphs	G1	A15
32	Vector notation and arithmetic	J3	G25
33	Vector geometry proof	J5	G25
34	Sampling	К1	S1
35	Histograms	L1	\$3
36	Scatter diagrams	L2	S6
	Averages and range from list of data (Mean, median, mode, LQ, UQ, IQR)	L3	54
É	Averages from tables	L3	54 →
39	Cumulative frequency curves and box plots	L1	S4
40	Mutually exclusive and independent events	M1	P8
41	Venn diagrams	M2	P9
42	Tree diagrams	M2	P9
43	Kinematics formulae (link to rearranging formulae?)	Q3	R11
44	Displacement time graphs	Q2	A15
45	Velocity time graphs	Q2	A15

@mr_man_maths

@mr_man_maths

Preparing GCSE Pupils for A Level Maths

CROSSOVER!

Topic No	Торіс	A Level spec	GCSE spec
	Year 13		
46	Simplifying algebraic fractions	B6	A4
17	Algebraic fractions - four operations	B6	A4
18	Composite functions	B8	A7
19	Inverse functions	B8	A7
50	Nth term of arithmetic sequence	D4	A25
51	Locating roots of equations such as $f(x) = 0$	11	A20
	Conditional probability (Two way tables, Venn, tree diagrams)	M2	P9

@mr_man_maths

Preparing GCSE Pupils for A Level Maths



Matt also posted the next tweet ...



Matt Man @mr_man_maths · Apr 25 mrmanmaths.wordpress.com/2022/03/13/pre..

From last year, here are my slides from #mathsconf28 where I give suggestions on what to do to prepare our current Year 11s for A Level Maths. #mathscpdchat

mrmanmaths.wordpress.com Preparing Year 11s for A Level Maths Following on from the MATHS (Making A-Level Transition Happen Smoothly) workshop last year,...

... and we have included another 'illustrative' tweet:



Dina Grimes @grimesmaths · Follow

Enjoyed my workshop with @mr_man_maths on Preparing year 11s for A level maths. #MathsConf28



The next tweet is the last of the three informative tweets from the host:





Matt Man @mr_man_maths · Apr 25

And this is where I want to thank @Advanced_Maths for providing this wonderful course so that Maths teachers have the opportunity to develop their subject knowledge and being confident in the A Level curriculum. I did this a couple of years ago and it was brilliant! **#mathscpdchat**



The quoted tweet from the AMSP is <u>here</u>.

This was the host's closing message:



Matt Man @mr_man_maths · Apr 25

And the hour is up! Thank you to all contributors who have given your views on supporting Year 11 students to be ready for A Level Maths. Please feel free to continue on discussions using the **#mathscpdchat** tag.