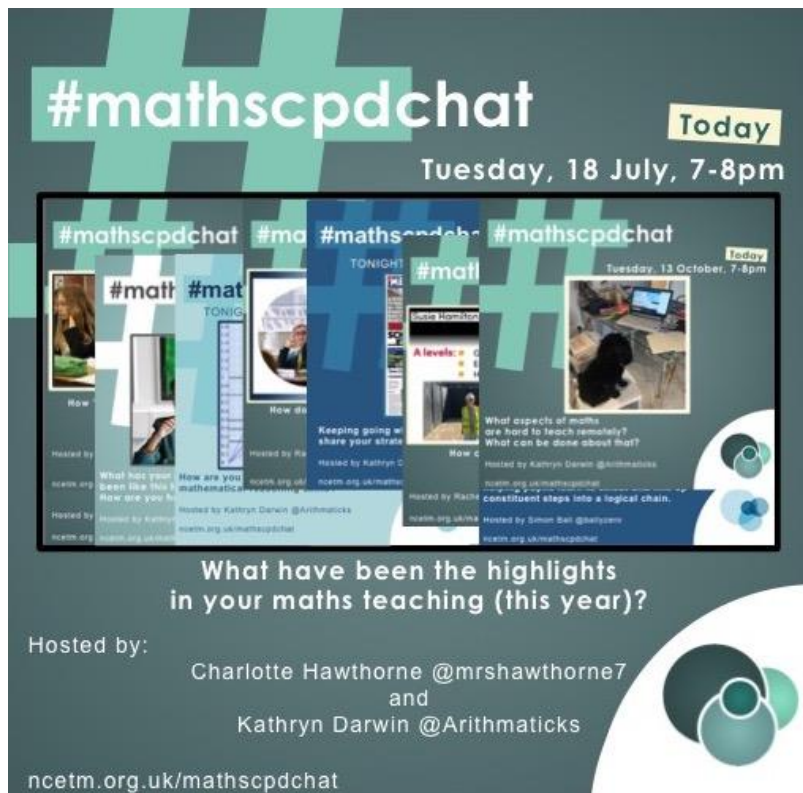


## #mathscpdchat 18 July 2023

What have been the highlights in your maths teaching (this year)?

Hosted by [Kathryn Darwin](#) and [Charlotte Hawthorne](#)

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



**#mathscpdchat** Today  
Tuesday, 18 July, 7-8pm

What have been the highlights in your maths teaching (this year)?

Hosted by:  
Charlotte Hawthorne @mrshawthorne7  
and  
Kathryn Darwin @Arithmatics

[ncetm.org.uk/mathscpdchat](http://ncetm.org.uk/mathscpdchat)

The links shared during this discussion were:

[SketchCPD resources](#) which are free resources created by [Charlotte Hawthorne](#). Her [SketchCPD website](#) includes 'Sketchnotes', a wide variety of attractively presented 'Resources' and a blog. It was shared by [Charlotte Hawthorne](#)

[Register for MEI Deeper Maths](#) which is where you can register for access to the free [MEI Deeper Maths](#) resources. The **MEI Deeper Maths Trigonometry Topic Overview** can be downloaded from the bottom of the page. It was shared by [Sarah Denison](#)

[Checkpoints](#) which are diagnostic maths activities on the NCETM website. These attractive materials are designed to help teachers develop their assessment of students' prior learning for KS3. It was shared by [Anthony Shaw](#)

[Integrals - Isolating the key ideas](#) which is a resource created by [Chris McGrane](#) and located on his [Starting Points Maths](#) website. It is a task in which the challenge is to state the appropriate integral-with-limits for each one of a set of images. It was shared by [Rob Southern](#)

[Average and Range Tiles](#) which is an interactive resource created by [Jonathan Hall](#) and located in the 'Manipulatives' section of his [MathsBot](#) website. Many different problems can be set up and explored by students/pupils and teachers. It is linked to '[Small data set average problems](#)' on Don Steward's website. It was shared by [Jonathan Hall](#)

[A simultaneous equations journey from primary to sixth form](#) which is a recent blog by [Matt Man](#) in which he describes and discusses a workshop that he delivered in June 2023 on the topic of simultaneous equations. It was shared by [Matt Man](#)

[Maths Learning Strands](#) which is an attractively presented sequence of images showing how aspects of learning maths may develop from 'Emerging' through 'Evolving', 'Expected', 'Exceeding' to 'Exceptional'. It was shared by [Matt Hawes](#)

[Topical Talk](#) which is a programme from [The Economist Educational Foundation](#) which supports weekly discussions about current affairs. They are classroom resources for pupils/students aged 9+. It was shared by [The Economist Foundation](#)

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

Kathryn's welcome message ...



**Kathryn MCCT** @Arithmaticks · 17h

Good evening everyone! Welcome to tonight's [#MathsCPDChat](#) with me and [@mrshawthorne7](#). This is the last one of these chats that are being run with the [@NCETM](#) at the helm. So we want to make it a good one!



... was followed by this reminder:



**Kathryn MCCT** @Arithmaticks · 17h

As always, please remember to use the hashtag in all your replies [#MathsCPDChat](#) - it is the only rule!



[Hannah Radcliffe \(@missradders\)](#), was the host of the very first NCETM [#mathsCPDchat](#). The [@mathsCPDchat](#) Twitter account, and the [#mathsCPDchats](#), were the 'brainchild' of the NCETM's Director of Communications at that time, [Steve McCormack](#), who established them in 2013. The first NCETM [#mathsCPDchat](#) took place, therefore, nearly ten years ago, and teachers have continued to engage in them enthusiastically on every term-time Tuesday evening since then. These facts provide background information for the next tweet that appeared:



**Hannah** 🙋 @missradders · 16h

Hello last.  
Have a good chat.  
From the first.  
x

There was a reply to Hannah's tweet from [Robert Smith](#) ...



**Robert J Smith** @RJS2212 · Jul 18

Last of Summer 2023 ... hopefully back soon [#MathsCPDChat](#)

... who refers to the probability that the [#mathsCPDchats](#) will continue next term under the joint management of teachers who have enjoyed taking part in them, but independently of the NCETM.

Kathryn then asked the first main question from the hosts ...



**Kathryn MCCT** @Arithmaticks · 17h

So let's kick off on a positive...

What is the best lesson/suite of lessons you have taught this year? What made them so good?

[#MathsCPDChat](#) @mrshawthorne7



... which prompted nine conversations, and some 'single' replies, involving about sixty contributions (tweets) altogether.

The first of the nine conversations shown next focuses on an example from a collection/website of useful and popular interactive resources (link provided at top of summary):



**Jonathan Hall** @StudyMaths · 17h

Maybe a slight element of recency bias here but this was great yesterday.  
[#mathsCDPChat](#)



**Jonathan Hall** @StudyMaths · Jul 17

Used this again today. Started with just the mean then slowly added the others from there.

After a bit of whole class practise, (the pupils with two-colour counters to model), I hit them with the “Don” button and they worked in pairs for the rest of the lesson. [twitter.com/studymaths/sta...](https://twitter.com/studymaths/status/1551111111)

(The link to ‘Averages and Range Blocks’ is in [the tweet](#) that [Jonathan](#) quoted.)

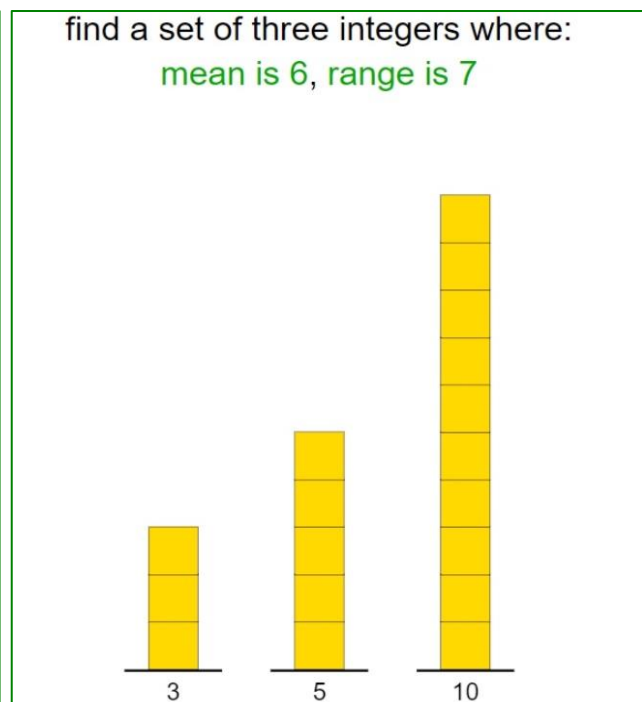
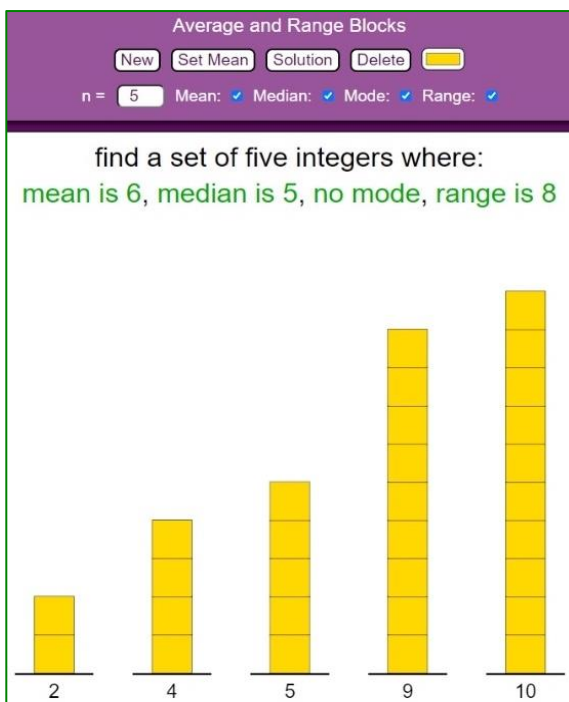


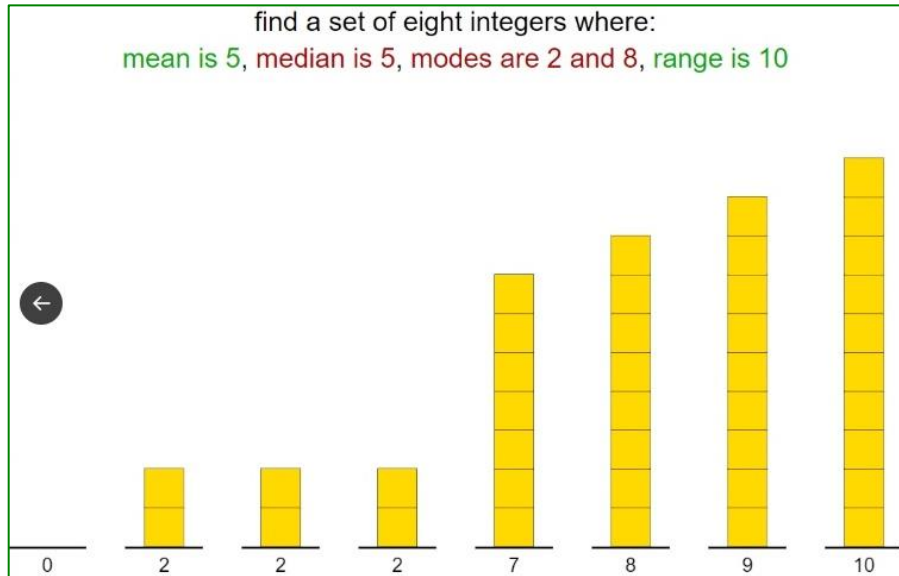
**Jonathan Hall** @StudyMaths · Jul 4, 2022

NEW: Averages and range tiles.

The averages turn from red to green as you form them.  
The “Set Mean” button speeds things up a bit.

[mathsbot.com/manipulatives/...](https://mathsbot.com/manipulatives/...)





**Kathryn MCCT** @Arithmaticks · 17h

...

Another classically beautiful King Don idea! Not a single #MathsCPDChat I've ever done goes without us mentioning him!



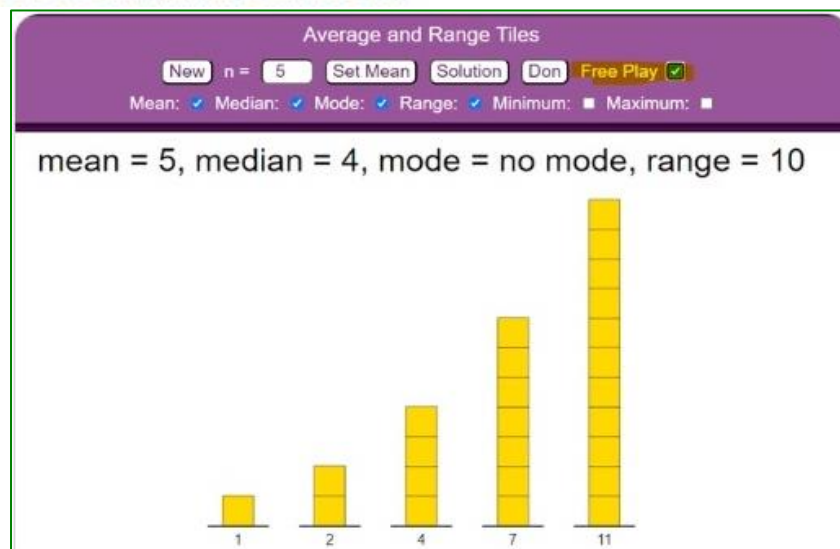
**Jonathan Hall** @StudyMaths · 15h

...

UPDATE: 'Free Play' option added to the Average and Range Tiles.

Lets you model how the averages change as tiles are added, removed or moved around.

[mathsbot.com/manipulatives/...](https://mathsbot.com/manipulatives/)




**Mary Pardoe** @PardoeMary · 1s


...

This is lovely! Just been playing with it (addictive) ... great for prompting thoughts about different ways of using it in lessons!


The next short 'chat' generated by the hosts' first main question is a reminder that students' resilience and willingness to help one another contributes to the success of maths lessons:

- 


**Matt Man** @mr\_man\_maths · 19h ...

Teaching A Level Further Maths to my Year 12s for the first time. The 6 students involved have been brilliant albeit with such a limited amount of time per week and after school too (2 hours). I do have more next year, woohoo! [#mathscpdchat](#)
- 

**Mary Pardoe** @PardoeMary · 19h ...

Can you describe (just one perhaps) way in which they've been brilliant Matt? [#mathscpdchat](#)
- 


**Matt Man** @mr\_man\_maths · 19h ...

The students' resilience and the willingness to help one another. One example is vectors. I'm not the strongest in that area, but seeing the students really helping each other, and in some ways, helping me too with understanding the methods and processes. [#mathscpdchat](#)
- 


**Mary Pardoe** @PardoeMary · 19h ...

The willingness to help each other! That's fantastic, and will help them so much! [#mathscpdchat](#)


This next discussion prompted thoughts and comments about pupils'/students' ability/readiness to explore/consider/look for different ways to calculate/work-out-results/solve-problems:

- 


**MrHawesMaths** @HawesMaths · 18h ...

Multiplication and division methods for me. So much discussion about multiple ways to solve problems. [#mathscpdchat](#)
- 


**Kathryn MCCT** @Arithmatics · 18h ...

Sounds brilliant - what kind of methods did your students come up with? How did you make sure it was useful for them all? [#MathsCPDChat](#)
- 

**MrHawesMaths** @HawesMaths · 18h ...

exploring how factors and multiples can really help. Like dividing by 5. Double then divide by 5.using prime factors to multiply and divide or the Egyptian method of using powers of 2. So many and really opened their eyes to making problems that little bit simpler [#mathscpdchat](#)
- 

**Kathryn MCCT** @Arithmatics · 18h ...

Please tell us more about this 'Egyptian Method'... I feel like I have heard of it before but can't place it! [#MathsCPDChat](#)
- 

**MrHawesMaths** @HawesMaths · 18h ...

Choose one value and keep doubling it. Then make combinations to create your second value and add them.



## Multiplication methods

### Key Ideas

### Main Notes

As you develop your maths, you will need to become efficient in multiplying more complex numbers. It is important to perfect a method that works for you and keep practising.

**Egyptian method**  $47 \times 36 = 1692$  ✓

*Step by step*

1 = 36  
2 = 72  
4 = 144  
8 = 288  
16 = 576  
32 = 1152

Add the combination  
that makes 47  
Here it is 32, 8, 4, 2, 1

152  
288  
144  
72  
36  
1692

- For this method, take one value (here we use 36)
- Double each time to generate some multiples (in powers of 2)
- Find a combination that will add to make your second value (47)
- Add these values together for your solution
- It doesn't matter which value you start with. Some numbers might be easier to work with than others. See the same calculation below but using 47 instead of 36

$47 \times 36 = 1692$  ✓

1 = 47  
2 = 94  
4 = 188  
8 = 376  
16 = 752  
32 = 1504

Add the combination  
that makes 36  
Here it is 32 and 4

1504  
188  
1692

- For this method, we started by doubling 47
- The combination that made 36 was 4 and 32
- Adding their values of 188 and 1504 gave 1692

7 = 7  
8 = 10  
7 = 4  
8 = 12  
9 = 9  
9 = 12  
11 = 2  
9 = 9  
8 = 5  
12 = 4

TRY THE METHOD WITH THESE ONES  
TO DEVELOP YOUR SKILLS

TRY THESE TO STRENGTHEN AND  
DEEPEN YOUR UNDERSTANDING

42 = 31  
31 = 25  
17 = 37  
42 = 39  
23 = 43  
45 = 6  
22 = 28  
46 = 31  
23 = 31  
23 = 62

### Important things to note

- The more confident you are in your times tables, the more efficient you will become. Here you really need to be able to double numbers effectively
- Double check your answers each time. Mistakes can happen!
- The more you practise, the better you will become
- Remember, you are likely to use the same method for larger or more complex calculations (involving decimals) or percentage calculations. The method is unlikely to change. Just how you present your answer.

### Reflection:





**Charlotte Hawthorne** @mrshawthorne7 · 18h ...

I don't feel like students (particularly younger year groups 7&8) have been as comfortable coming up with different methods. I remember in my first school in 2012 students LOVED saying they had another way. Recently v. answer focused IMO [#mathsCPDchat](#)



**Helen Drury** @DrHelenDrury · 22h ...

Really interesting observation. Does it bring any benefits (are more students more confident, for example) or is it just an increased answer-focus, and that's that?



**MrHawesMaths** @HawesMaths · 22h ...

It really helped with angle chasing algebra and other problem solving areas. It's a nice topic to be able to dig deep and challenge their methods and approaches. Particularly if you ask them to come up with a peculiar example. [#mathscpdchat](#). Method over solution.



**Anthony Shaw** @ShawMaths · 22h ...

Why do you think this is?

I find Y7s are often very confident with written methods like column addition but not great at articulating mental methods.

Matt Hawes' reply (already shown above) to the hosts' first main question ...

What is the best lesson/suite of lessons you have taught this year? What made them so good?



**MrHawesMaths** @HawesMaths · 18h ...

Multiplication and division methods for me. So much discussion about multiple ways to solve problems. [#mathscpdchat](#)

... prompted a question from another contributor which provided an opportunity for more clarification by Matt (MrHawesMaths):



**Joanne Green**  @MsJoanneGreen · 22h ...

@HawesMaths [#mathscpdchat](#) @mrshawthorne7 and what made it so special?

(What made it so special?)



**MrHawesMaths** @HawesMaths · 22h ...

The discussions between students about their approaches and their understanding of how maths sometimes isn't just a method but can be approached from different viewpoints. Seems to break down a barrier and meant they could really experiment and explore freely. [#mathscpdchat](#)

Rob Southern's reply to the hosts' question prompted him (in the conversation shown next) to share a task to which students also responded by exploring alternative approaches:



**Rob Southern** @mrsouthernmaths · 19h

Y10: Constructions! They get a lot of bad press, but the Mathspad resources are superb.

Y12: Integration. We used this lovely activity from @ChrisMcGrane84 They came up with so many different approaches and some beautiful links to graphical transformations



**Rob Southern** @mrsouthernmaths · 19h

Oh and graphical transformations, but I'm sure everyone is bored of me talking about them.



**Kathryn MCCT** @Arithmaticks · 19h

\*Goes to find the @MathsPadNicola resources on constructions immediately...\*

Which resource from @ChrisMcGrane84 !?  
#MathsCPDChat

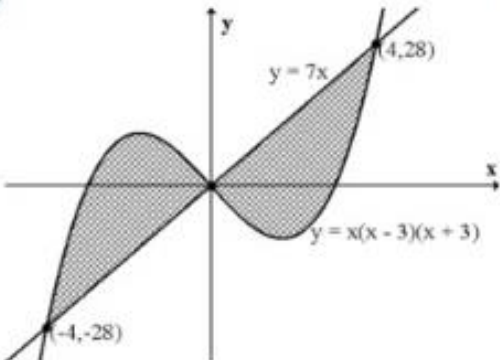


**Rob Southern** @mrsouthernmaths · 18h

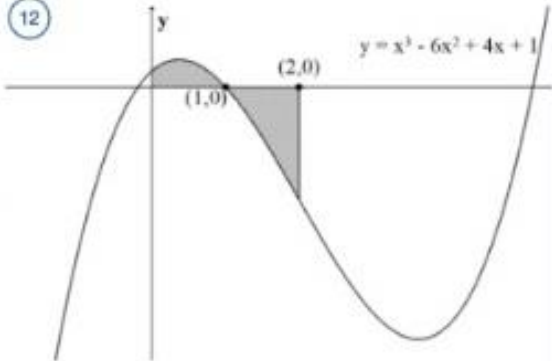
This one.  
[startingpointsmaths.com/2023/01/14/int...](https://startingpointsmaths.com/2023/01/14/int...)

The idea is to identify the integral without performing the calculations but we had lots of fun doing them a variety of different ways.

11



12



startingpointsmaths.com


**Integrals – Isolating the key ideas**

In this task all the pupils need to do is write down the integrals with limits. I won't ask them to go on and find the areas in this one. We ...

This was another short conversation in response to the first question:

-  **Emma Ball** @BallEmma1 · 19h ...  
A sequence of 7 directed number lessons with never used before double sided counters and whiteboards. In using so many small steps, the whole year group gained a really deep understanding of the whole topic.
-  **Kathryn MCCT** @Arithmaticks · 19h ...  
How did you know they had such an impact? #MathsCPDChat
-  **Emma Ball** @BallEmma1 · 19h ...  
End of unit test plus retrieval throughout the year and I included them in this year's end of year assessment and had pupils drawing counters to answer the questions.

One of the two hosts responded to their question posted by the other host:

-  **Charlotte Hawthorne** @mrshawthorne7 · 20h ...  
Well, I'll have a go at this one...I absolutely loved teaching Pythagoras and trigonometry to my y10/y11 over last summer/this autumn. I have taught them since year 8 so trig was all done around unit circle and then proportional reasoning and using ratio tables. #mathsCPDchat
-  **Kathryn MCCT** @Arithmaticks · 20h ...  
Well you know that makes me happy! How did they find it? How was it compared to previous iterations of the lesson? #MathsCPDChat
-  **Charlotte Hawthorne** @mrshawthorne7 · 20h ...  
Hard to compare, especially for the trig stuff. When you know a class well there are so many things you can do. The Pythagoras on the other hand was all down to the sequencing of the tasks, and the scaffolding. Don's & few of my resources, worked wonders with most #mathsCPDchat
-  **Kathryn MCCT** @Arithmaticks · 20h ...  
I loved using your resources for that this year - such a coherent pathway though the topic. Year 9 are so confident with it now! #MathsCPDChat
-  **Charlotte Hawthorne** @mrshawthorne7 · 19h ...  
Thanks! I think the 'Square puzzles' which are more like area puzzles helps a lot.  
[sketchcpd.com/resources](https://sketchcpd.com/resources) under geometry if anyone wants to take a look.  
#mathsCPDchat

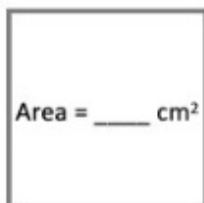


## More Squares

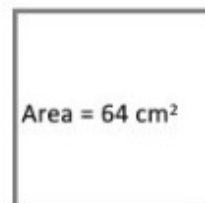
1. Find the **area** or **side length** of these squares, giving your answers correct to 2 decimal places where necessary.



Side length = 3cm



7cm



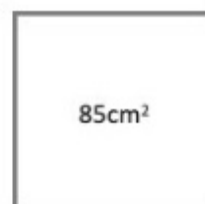
\_\_\_ cm



7.5cm



\_\_\_ cm



\_\_\_ cm

2. The **area** of the first two squares **together** is equal to the area of the larger square. What is the side length of the larger square?



\_\_\_ cm

3. The following problems work in the same way; the compound shape made of squares has an **area** equal to the area of the larger square on the right. Find the missing lengths in each diagram.



\_\_\_ cm



\_\_\_ cm



17 cm

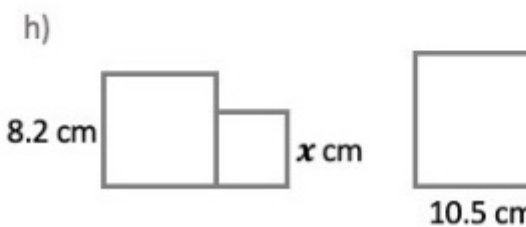
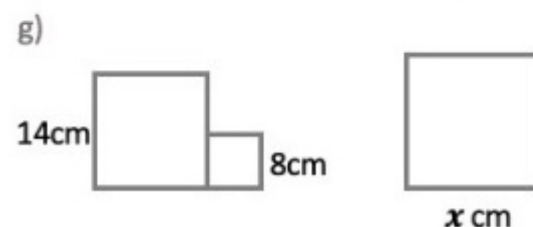
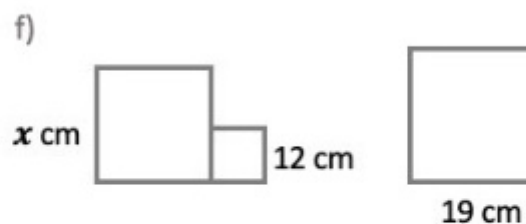
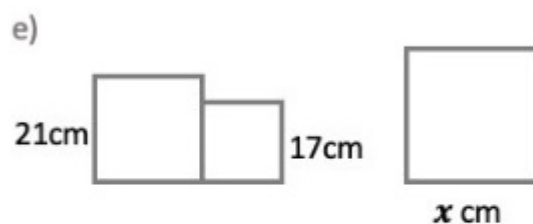
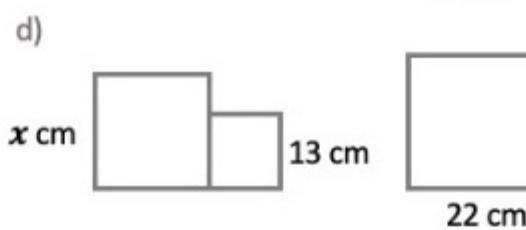
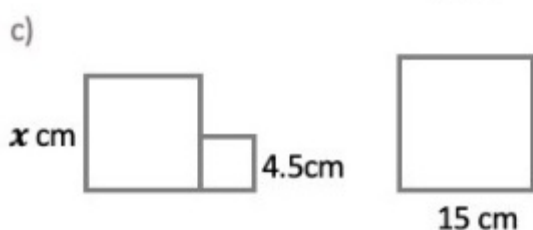
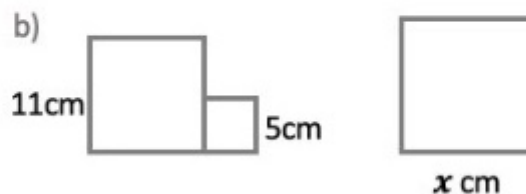
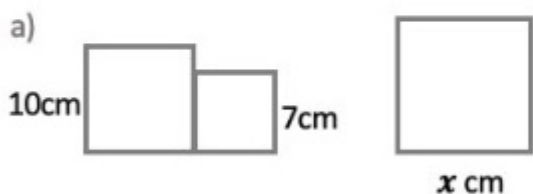


53 cm

Just like the previous task, the **compound shape** made of squares has an **area equal to the larger square**.

Find the missing lengths, labelled  $x$ , in each diagram correct to 1.d.p.

(diagrams are **not** drawn to scale)



Below is the working out for g) and h)

$$\begin{aligned}x^2 &= 14^2 + 8^2 \\x &= \sqrt{14^2 + 8^2} \\x &= \quad \text{cm}\end{aligned}$$

$$\begin{aligned}10.5^2 &= 8.2^2 + x^2 \\x^2 &= 10.5^2 - 8.2^2 \\x &= \sqrt{10.5^2 - 8.2^2} \\x &= \quad \text{cm}\end{aligned}$$

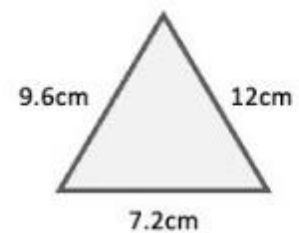
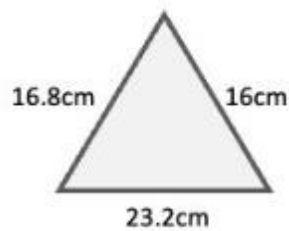
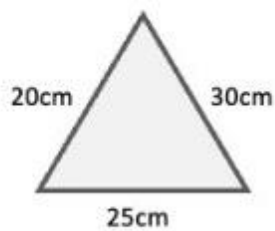
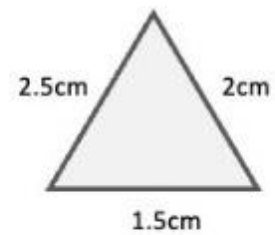
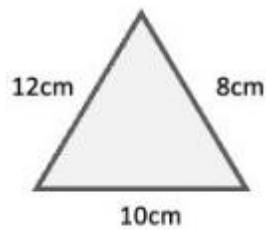
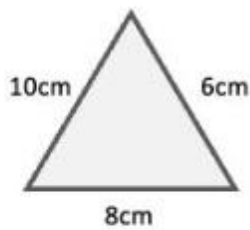
In your books, show the working out for e) and f) in the same way

## Terrible Triangles

These triangles are not *in any way* drawn accurately!  
In fact, the only thing correct is that they have three straight sides!

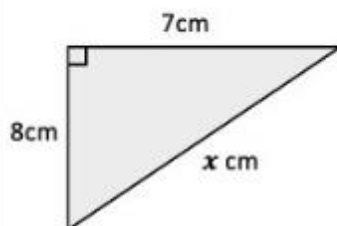
Given the measurements of the sides work out if, when drawn accurately:

- the triangles would be **right angled** and,
- if they are, mark on **where** the right angle would be.

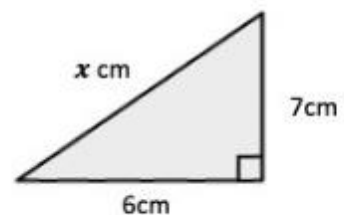
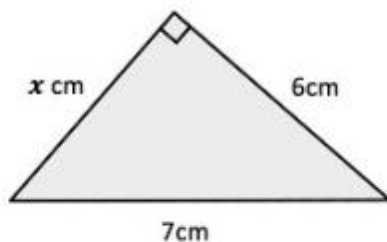
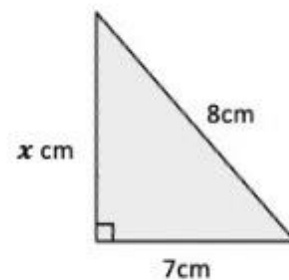


## Whose working out is it anyway?

Match the diagram to the correct working out.



- (A)  $6^2 + 7^2 = x^2$
- (B)  $7^2 - 6^2 = x^2$
- (C)  $8^2 + 7^2 = x^2$
- (D)  $8^2 - 7^2 = x^2$





**Karen @karenshancock** · 19h

...

Love this... The Deputy head who teaches the parallel class to me complemented me on the introduction to Pythagoras that I planned for our classes... I did you give you credit! [#MathsCPDChat](#)



**Kathryn MCCT @Arithmaticks** · 19h

...

Our external visitor for our deep dive also really liked it! [#MathsCPDChat](#)

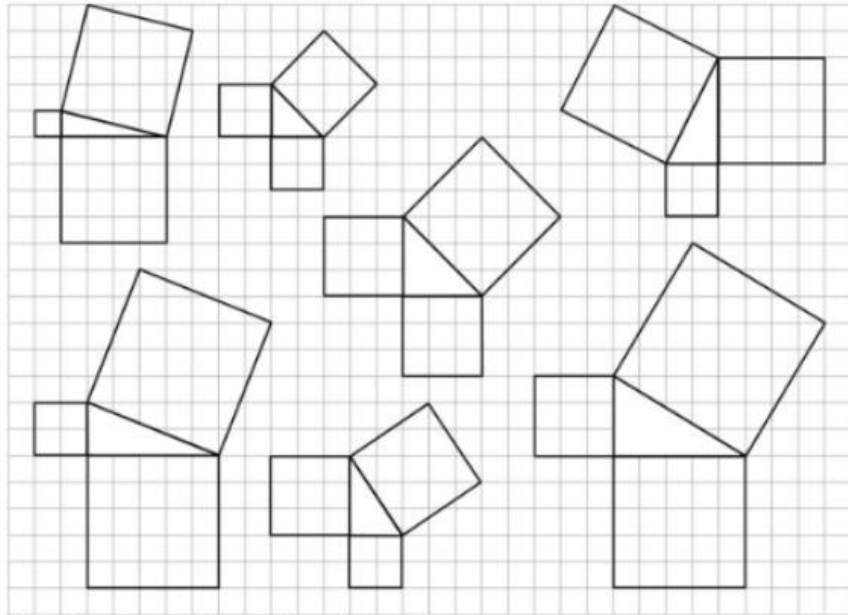


**Kathryn MCCT @Arithmaticks** · 20h

...

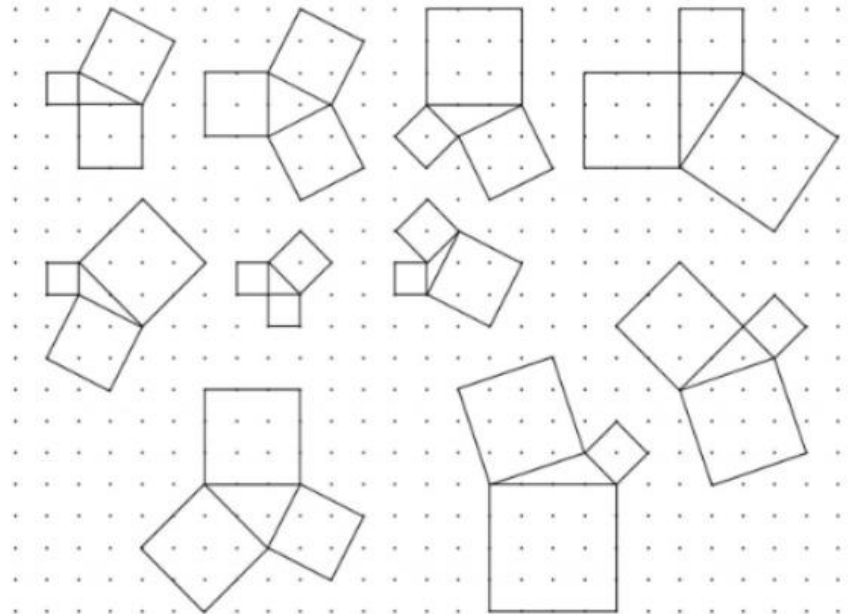
The Skew Squares bit between these is also just a magical moment. Lovely King Don! [#MathsCPDChat](#)

Work out the areas of these squares that have been placed together to form triangles.








What do you notice about each set of squares?

Work out the areas of these squares that have been placed together to form triangles.




Don Steward task: [donsteward.blogspot.com/2012/07/skew-squares.html](http://donsteward.blogspot.com/2012/07/skew-squares.html)

The next short exchange includes a reference to GeoGebra, and a reminder that including the hashtag in all tweets is necessary if the #mathsCPDchat is to be as helpful as possible:

-  **Anthony Shaw** @ShawMaths · 20h ...  
Trig
- I've been playing with unit circles and similar triangles for years but it felt like it clicked this year. Made it simpler and kids liked it.
-  **Kathryn MCCT** @Arithmaticks · 20h ...  
Wahey! Similar to @mrshawthorne7 then! Can you share any resources that particularly made it successful? #MathsCPDChat
-  **Anthony Shaw** @ShawMaths · 20h ...  
Most was just a bit of GeoGebra, a whiteboard pen and me. But I made a gap fill using "unit triangles" that makes finding the hypotenuse easier.
-  **Anthony Shaw** @ShawMaths · 20h ...  
#mathscpdchat (I'm rubbish at tagging these!)
-  **Kathryn MCCT** @Arithmaticks · 20h ...



In this conversation the focus was on students and teachers using algebra tiles ...

-  **Lizi Pepper** @mathspeptalk · 21h ...  
Algebraic manipulation using algebra tiles! Particularly completing the square, now they know why to half the coefficient of x! #mathscpdchat
-  **Kathryn MCCT** @Arithmaticks · 21h ...  
The first time someone showed me this (I think @StudyMaths ) I was just STUNNED! Made me fall in love with algebra tiles. #MathsCPDChat
-  **Charlotte Hawthorne** @mrshawthorne7 · 20h ...  
Same! Proper wow moment. I love sharing with trainees but usually @KatefsmathsPGCE gets there before me 😊 #mathsCPDchat





**Jacob** @WonderingMaths · 20h

...

Such a great tool for student understanding with completing the square!



**Mary Pardoe** @PardoeMary · 21h

...

Can you remember anything that students \*said\* or did that made you think the algebra tiles 'made all the difference' Lizi? [#mathscpdchat](#)



**Lizi Pepper** @mathspeptalk · 21h

...

Yesss! After removing them, expanding brackets, one of them literally described the rectangle aloud when doing one as retrieval at a much later date! He had the image there in his head! And no silly mistakes adding instead of multiplying, finding factorising easier! [#mathscpdchat](#)



**Mary Pardoe** @PardoeMary · 21h

...

At a much later date! Wow ... that's SO worth noting! [#mathscpdchat](#)

... and in the next chat thoughts were about helping students use time-telling/recording conventions with understanding and confidence:



**Catherine Edwards** @Edwards08C · 21h

...

I've been loving teaching entry level this year. Really enjoyed teaching telling the time, partly because I enjoyed researching the sequence to teach and also seeing the kids succeed. [#mathsCPDchat](#)



**Kathryn MCCT** @Arithmaticks · 21h

...

Tell us more about the sequencing for the time lessons! I have never had to teach it but I think SO many students would benefit. Many of them have no idea about time when I say things like "20 to 1" instead of 12:40. [#MathsCPDChat](#)



**Catherine Edwards** @Edwards08C · 21h

...

The vocab practice was huge, making sure we used all the different ways of saying and writing time. Lots of matching and fill in the gap. Also used a straight number line before curving it into a clock too. [#mathscpdchat](#)



**Mary Pardoe** @PardoeMary · 21h

...

Interesting Catherine! What worked particularly well? [#mathscpdchat](#)



**Catherine Edwards** @Edwards08C · 21h

...

Lots and lots of different representations of clock faces with multiple colours for to and past etc. (have a high proportion of EAL too) Starting with the hour hand only then minutes. [#mathscpdchat](#)

These were the remaining responses to the first main question of this [#mathsCPDchat](#):

What is the best lesson/suite of lessons you have taught this year? What made them so good?

- 

**Robert J Smith** @RJS2212 · 21h ...

I am sure I here @StudyMaths quote John Mason all the time about this... Now, if only I could remember what Jonny says 🤔🤔🤔
- 

**Claire Webster** @polomad20 · 19h ...

Algebraic fractions... loved it for so many reasons
- 


**Economist Foundation** ✓ @Econ\_Foundation · 17h ...

We're excited to join the last #mathscpdchat of the academic year! A huge highlight for us was our recent Special Edition on numeracy in the news. It's been great to hear how students have been getting on with the activities and the confidence they've built across the lessons.... [Show more](#)
- 

**Economist Foundation** ✓ @Econ\_Foundation · 17h ...

Another highlight was National Numeracy Day 2023! It was great to see so many teachers highlight the importance of building maths confidence in the classroom and beyond! What's been your #MathsMoment? [#mathscpdchat](#) [#Learning](#)

The second main question ...

- 

**Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...


Next question of the evening

What new things have you tried in the classroom that have been successful?

[#mathsCPDchat](#)





... again prompted several (eight) conversations, and some single replies. This next one was about 'opening a whole new version of maths' for some students:






- 

**Michelle** 🇺🇦 @mideco\_2883 · Jul 18 ...

Bar modelling, ratio tables and double number lines with my Resit students. It was like opening a whole new version of maths to some of them. Seeing their confidence grow was amazing! [#mathscpdchat](#)

-  **Mary Pardoe** @PardoeMary · Jul 18 ...  
This is lovely to hear! Can you say briefly just one way in which using double number lines 'opened their eyes' Michelle? #mathscpdchat
-  **Michelle** 🇺🇦 @mideco\_2883 · Jul 18 ...  
As a way of laying out their work logically so they could follow what they had done. Also it gave them confidence to start on a question they perhaps would not have attempted before.
-  **Mary Pardoe** @PardoeMary · Jul 18 ...  
Thank you! #mathscpdchat
-  **Jacob** @WonderingMaths · Jul 18 ...  
How did you find using ratio tables with them? #mathscpdchat
-  **Michelle** 🇺🇦 @mideco\_2883 · Jul 18 ...  
They really took to it, particularly for speed, distance, time questions.

In the long conversation shown next positive consequences of using the MEI's *Deeper Maths* resources are discussed, as is spaghetti, and benefits of sometimes working with teachers from other schools (photographs of a session led by a #mathsCPDchat contributor/host, Matt Man, are included from a tweet that he quoted):

-  **Lizi Pepper** @mathspeptalk · Jul 18 ...  
I've tried trig using the unit circle for the first time and found it really interesting, I've learned a lot about what to do and what not to do for next time too! Never going back to procedural teaching of trig again!  
#mathsCPDchat
-  **Robert J Smith** @RJS2212 · Jul 18 ...  
Any other thoughts on unit circle??
-  **Lizi Pepper** @mathspeptalk · Jul 18 ...  
Just what I've learned from doing it 😊 I'm sure I'll learn even more next time! #mathscpdchat
-  **Lizi Pepper** @mathspeptalk · Jul 18 ...  
MEI deeper resources are great. Introduce sine and cosine at the same time, do loads with unit circle before using similar shapes. Stick with the formulae they generate themselves (opp=sin angle x hyp) instead of the usual ones. Don't introduce tangent too soon! #mathscpdchat
-  **MrsD (Taylor's Version)** @MrsDMaths · Jul 18 ...  
[forms.mei.org.uk/form/121](https://forms.mei.org.uk/form/121) Here to register for the Deeper Maths resources (all free)



**Matt Man** @mr\_man\_maths · Jul 18

Oh trigonometry and spaghetti and unit circle resource from @Integral\_Maths and @MEIMaths. The students found it so useful! #mathscpdchat



**Kathryn MCCT** @Arithmaticks · Jul 18

I need to find this now... spaghetti?! Please tell me they made a joke about the unit circle being a giant meatball...? (And also why it is pedagogically brilliant, obviously!) #MathsCPDChat



**Charlotte Hawthorne** @mrshawthorne7 · Jul 18

You've never done a spaghetti trig graph? 🤔 #mathsCPDchat



**Karen** @karenshancock · Jul 18

Phew - I was worried it had died out. Pleased to see it hasn't #MathsCPDChat



**Kathryn MCCT** @Arithmaticks · Jul 18

NO!? WHAT?! #MathsCPDChat



**Karen** @karenshancock · Jul 18

I've got a worksheet somewhere if you can't find the webpage... give me a mo... #MathsCPDChat



**Karen** @karenshancock · Jul 18

Oh, google will be your friend - there's loads out there "Spaghetti Trig" - use Sellotape to stick down the spaghetti - and if you draw a small circle you can get the tangent graph by creating tangents which is nice. #MathsCPDChat



**Kathryn MCCT** @Arithmaticks · Jul 18

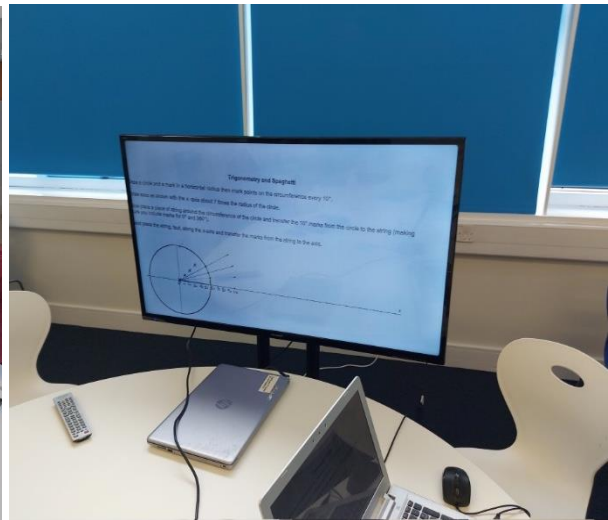
My mind is blown. #MathsCPDChat



**Matt Man** @mr\_man\_maths · Jul 18

Here it is @Arithmatics, I did this as part of one of the workshop sessions for @GLOWMaths #mathscpdchat

**NBHS Maths** @NBHSMaths · Feb 15  
Following on from the morning, Mr Man used the ideas from teaching Year 12 on trigonometry and tested this with colleagues from @BaxterCollege and @StourportHigh for @GLOWMaths. Lots of probing discussions and ideas shared to be taken to their classrooms. @NorthBromsgrove



(This is [the tweet](#) that [Matt](#) quoted.)

Matt added the next two comments:



**Matt Man** @mr\_man\_maths · Jul 18

Being an LLME for "Developing A Level pedagogy" for @NCETM @GLOWMaths. It has really helped me in 1. Leading high quality CPD to colleagues from different schools and 2. Helped me to really reflect on my A Level teaching which leads to better results. #mathscpdchat



**Matt Man** @mr\_man\_maths · Jul 18

...

Another thing is continuing to embed A Level teaching right down to GCSEs and increasing the student's belief and confidence that actually the gap between GCSE and A Level is not as big as it seems. Reminds me back to one of the earlier [#mathscpdchat](#) that I led!

The use of individual (mini) whiteboards was discussed in the next thread:



**Conor Jones** @conorjone93 · Jul 18

...

Getting students to write down examples right at the end of the lesson rather than as I am teaching/after I have modelled an example. I felt like students get more time to practice and are more focused when I am teaching. Will do more of this in Sept! [#mathsCPDchat](#)



**Jacob** @WonderingMaths · Jul 18

...

This sounds great! Will have to try it.



**Conor Jones** @conorjone93 · Jul 18

...

It's also meant they are using whiteboards so much more than they were previously, which has developed their abilities to try things out without worrying about making mistakes! [#mathsCPDchat](#)



**Mary Pardoe** @PardoeMary · Jul 18

...

Do they look at each others whiteboards much Conor? I often wonder about that, and if so what effect does it have on them (how do they react to what others put on their boards?)? [#mathscpdchat](#)



**Conor Jones** @conorjone93 · Jul 18

...

Absolutley they do, paticularly at the start! But I feel the more used to a low-pressure environment when it comes to attempting "your turn" type questions they then become more willing to try themselves. This hopefully builds confidence in themselves! [#mathsCPDchat](#)



**Mary Pardoe** @PardoeMary · Jul 18

...

Great ... and very interesting Conor! Thanks! [#mathscpdchat](#)

Homework was the subject of this conversation:



**Karen** @karenshancock · Jul 18

...

A lot more providing of answers to homework sheets (we don't currently do online homework) and then Spot test in lesson 7 days later on a couple of questions from the homework. Emphasis on performance in spot test not on homework sheet. [#mathsCPDchat](#)



**MrHawesMaths** @HawesMaths · Jul 18

...

I so do this with OneNote. Students can work through the tasks and then assess their work straight away. Prints great discussions with pupils when we sit down to identify the mistake/misconception. Early intervention is great [#mathscpdchat](#)



**Kathryn MCCT** @Arithmaticks · Jul 18

...

Interesting! How have students responded to this? [#MathsCPDChat](#)



**Karen** @karenshancock · Jul 18

...

Most classes fine. One class needed some support to get the idea... To the extent that they needed two possible answers for each question for a few weeks to help them realise they had to do the work and then check the answer! [#MathsCPDChat](#)



**Kathryn MCCT** @Arithmaticks · Jul 18

...

I was just going to say, with some classes you run the risk of them opting out with something like this, but just a bit of MCQ resolved that? [#MathsCPDChat](#)



**Karen** @karenshancock · Jul 18

...

Yes, I find it helps if you then pop one or two of the questions from the homework sheets on an early assessment too. Makes the point that we're trying to make. The best you can hope for is the questions you've done before and got right come up on the tests. [#MathsCPDChat](#)



**Kathryn MCCT** @Arithmaticks · Jul 18

...

Interesting... do you keep track of who is doing the homework then? Or just hope they see that it is a helpful thing to do? [#MathsCPDChat](#)



**Karen** @karenshancock · Jul 18

...

We expect them to hand in the homework too. Marked and corrected. The spot test is to encourage them not to copy, or if someone else helps them to make sure they understand the help they've been given. [#MathsCPDChat](#)



**Kathryn MCCT** @Arithmaticks · Jul 18



...

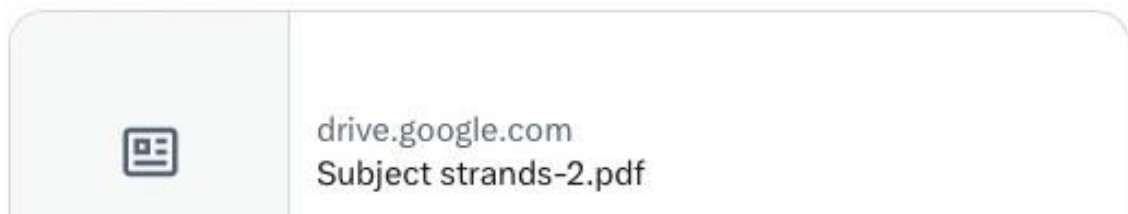
I like this a lot! Thank you for sharing [#MathsCPDChat](#)

Mini-whiteboards were mentioned again in the following interchange:

-  **David Casey** @casey\_david · Jul 18 ...  
Following on from working with @mrbartonmaths silent teacher, live modelling and mass participation using mini whiteboards have been a huge success
-  **Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...  
This sounds really good. How have the students taken to it? Is this just you or the whole department? #mathsCPDchat
-  **David Casey** @casey\_david · Jul 19 ...  
Mass participation is now a whole school initiative- students taken it really well. The others are department level at the moments

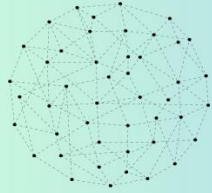
Matt Hawes shared an enterprise designed to help students develop their skills in some aspects of learning and doing mathematics, and thus shift the emphasis, for students and teachers, away from merely 'ploughing through' topics:

-  **MrHawesMaths** @HawesMaths · Jul 18 ...  
The introduction of our subject strands to really try and develop a culture during lessons. Makes targets etc more meaningful as they are actually able to work on it. Rather than 'adding fractions with different denominators...'. #mathscpdchat
-  **MrHawesMaths** @HawesMaths · Jul 18 ...  
I put it here if you want to see [drive.google.com/file/d/1fGPd\\_a...](https://drive.google.com/file/d/1fGPd_a...) #mathscpdchat



The six 'subject strands' (in the resource shared in the tweet shown above) are: Mathematical Knowledge (Number sense and fluency), Contributions in discussions (Making mathematical connections), Problem Solving (conceptual understanding), Communication and Reasoning (Spoken and written forms), Perseverance (Logical and analytical approaches leading to independence, and Reviewing and Improving (Leading to independence). In each strand a short paragraph indicates the meaning of each of the descriptions, which are 'Emerging, Evolving, Expected, Exceeding and Exceptional'. We show one of the strands next, as an example:





## CONTRIBUTIONS IN DISCUSSIONS

(MAKING MATHEMATICAL CONNECTIONS)

### 1 EMERGING

Prefers to listen to the discussion and is yet to contribute ideas preferring to wait for a solid explanation



### 2 EVOLVING

Shares ideas when asked and confident that ideas or solutions are correct



### 3 EXPECTED

Offers ideas independently when confident they are correct



### 4 EXCEEDING

Offers ideas even when unsure as well as when confident. Raises hand without specific encouragement to offer suggestions and is able and happy to appreciate working of peers



5

## EXCEPTIONAL

Offers ideas when unsure and when confident. Raises hand without specific encouragement to offer suggestions and is confident to appreciate working of peers. Is happy to ask questions even if this shows a lack of understanding of the material being discussed



**Mary Pardoe** @PardoeMary · 5h



Where is this from Matt?



**MrHawesMaths** @HawesMaths · 5h



The subject strands were developed as being part of PSB (pre senior baccalaureate). The document I created as a handout for students and parents so show how they could develop in these areas. Forms the main basis of our reporting now.

The 'single' replies to the second question are shown next:

What new things have you tried in the classroom that have been successful?



**Anthony Shaw** @ShawMaths · Jul 18



Less about teaching more leadership but I've been trying some more joint planning and instructional coaching to improve consistency of high quality T&L.

It's early days but the team is much more excited about talking about maths.

[#mathscpdchat](#) (I remembered!)



**MrHawesMaths** @HawesMaths · Jul 18









The introduction of our subject strands to really try and develop a culture during lessons. Makes targets etc more meaningful as they are actually able to work on it. Rather than 'adding fractions with different denominators...'. [#mathscpdchat](#)



**Catherine Edwards** @Edwards08C · Jul 18



Used a lot of goal free problems for angle chasing with my y8 set 3 which improved their confidence at tackling AO3 angles questions  
[#mathscpdchat](#)

-  **Nyhan** @anthhanson · Jul 19 ...  
Getting rid of all wall displays and surrounding my room with huge whiteboards. Getting the ss to problem solve in pairs. Person holding the pen takes instruction from the other. 90 min lesson broke up with 2 whiteboard slots lasting 20 mins each. Misconceptions are v visible
-  **Mrs Gilmour** @BusyMrsG · Jul 19 ...  
Bar modelling and the use of manipulatives in maths especially algebra tiles!
-  **Joanne Green**  @MsJoanneGreen · Jul 18 ...  
[@mrshawthorne7](#) because I travel so much, using a ruler in art class never ceases to amaze me. So many pupils don't realise it's ok to do that. [@Arithmaticks](#) [#mathscpdchat](#) Mental maths with year 7 when doing angles and also algebra. That was great, another proud moment.
-  **Jacob** @WonderingMaths · Jul 18 ...  
Variation with topics like expanding double brackets. Thinking carefully about the examples that I use and questions that I give to pre-empt any misconceptions. [#mathsCPDchat](#)
-  **Educator Supe** @ShakinthatChalk · Jul 18 ...  
A form of flipped learning using [@SparxMaths](#) and iPads where I set the class of a series of unit codes and teach only when help is requested. They often was individually with occasional whole class teaching if common themes emerged.

The hosts' third main question ...

-  **Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...  
It's time for question number 3 in our reflection of 2022-23 in maths teaching. [@Arithmaticks](#) and I would love to know...

What is the best CPD you have done this year? How did it change your practice?

[#mathsCPDchat](#)



... again prompted several conversations and single replies. Working to become a Secondary Mastery Specialist was mentioned ...



**Lizi Pepper** @mathspeptalk · Jul 18 ...

@NCETM Secondary Mastery Specialist - I've learned more this year than the sum of my previous years! #mathscpdchat



**Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...

Agreed. Great programme! If you don't have one in your department, apply to be one. Such fantastic CPD. #mathsCPDchat

... and 'joint' planning and the NCETM Checkpoints were highlights:



**Anthony Shaw** @ShawMaths · Jul 18 ...

Joint planning.

Doing some S-plans and sequencing, really thinking about what we want kids to learn, understand and how best to challenge and stretch.

My team is amazing and full of ideas!

#mathscpdchat



**Jacob** @WonderingMaths · Jul 18 ...

I've found S-planning to be such a great way of looking in detail at the small steps this year too!



**Kathryn MCCT** @Arithmatics · Jul 18 ...

What is the best thing you have been able to 'steal' from a colleague through this work? And what do you think the best thing you have contributed is? #MathsCPDChat



**Anthony Shaw** @ShawMaths · Jul 18 ...

Stealing... more concrete grounding and exploration of coordinates and problem solving with them before launching into straight line graphs.

Contributed... double number lines and ratio tables (thanks to you and @LearningMaths)

#mathscpdchat





**Anthony Shaw** @ShawMaths · Jul 18 ...


Oh and checkpoints! I love @ncetm checkpoints!


#mathscpdchat

Other 'sources' of CPD experienced as effective included a Maths Hub Work Group and the subject associations:

- 

**Michelle** 🇺🇦 @mideco\_2883 · Jul 18 ...  
The NCETM GCSE Maths Resit CPD and the MA/ATM maths conference.  
[#mathscpdchat](#)
- 

**Kathryn MCCT** @Arithmaticks · Jul 18 ...  
What particularly sticks out for you in terms of the conference?  
[#MathsCPDChat](#)
- 

**Michelle** 🇺🇦 @mideco\_2883 · Jul 18 ...  
John Burkes session on Different Problems, Same Answer. I hope to make use of his resources next year now I have had time to look though them all. And Anne Watsons session on number really made me think hard about how to teach maths better.
- 

**Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...  
I was in Anne's session, and although I could be called biased as I just love everything that Anne and John do, this session was indeed another excellent session which gave me loads to consider about how the idea of a number changes throughout school maths [#mathsCPDchat](#)

Another conference session was also appreciated and discussed ...

- 

**Rob Southern** @mrsouthernmaths · Jul 18 ...  
At [#Mathsconf31](#) I went to [@Cshearer41](#) workshop on introducing hypothesis testing and it was brilliant. The activities and the language Catriona used to frame the topic was excellent. My Year 13s loved it.  
[#mathscpdchat](#)
- 

**Andrew Stacey** (@loopspacemathstodon.x... @mathfor... · Jul 18 ...  
I second this.
- 

**Kathryn MCCT** @Arithmaticks · Jul 18 ...  
I need her to do one on how to solve those MAD circle problems... maybe it could involve mandalas... [@studymaths](#) were doing lots of conjecturing about how to colour in areas to make '#zero pairs' in our mandala workshop last week! [#MathsCPDChat](#)



**Jonathan Hall** @StudyMaths · Jul 18

...

That was fun! Although after 5 hours got a little tiresome. Still can't believe you did more during your lunch break!

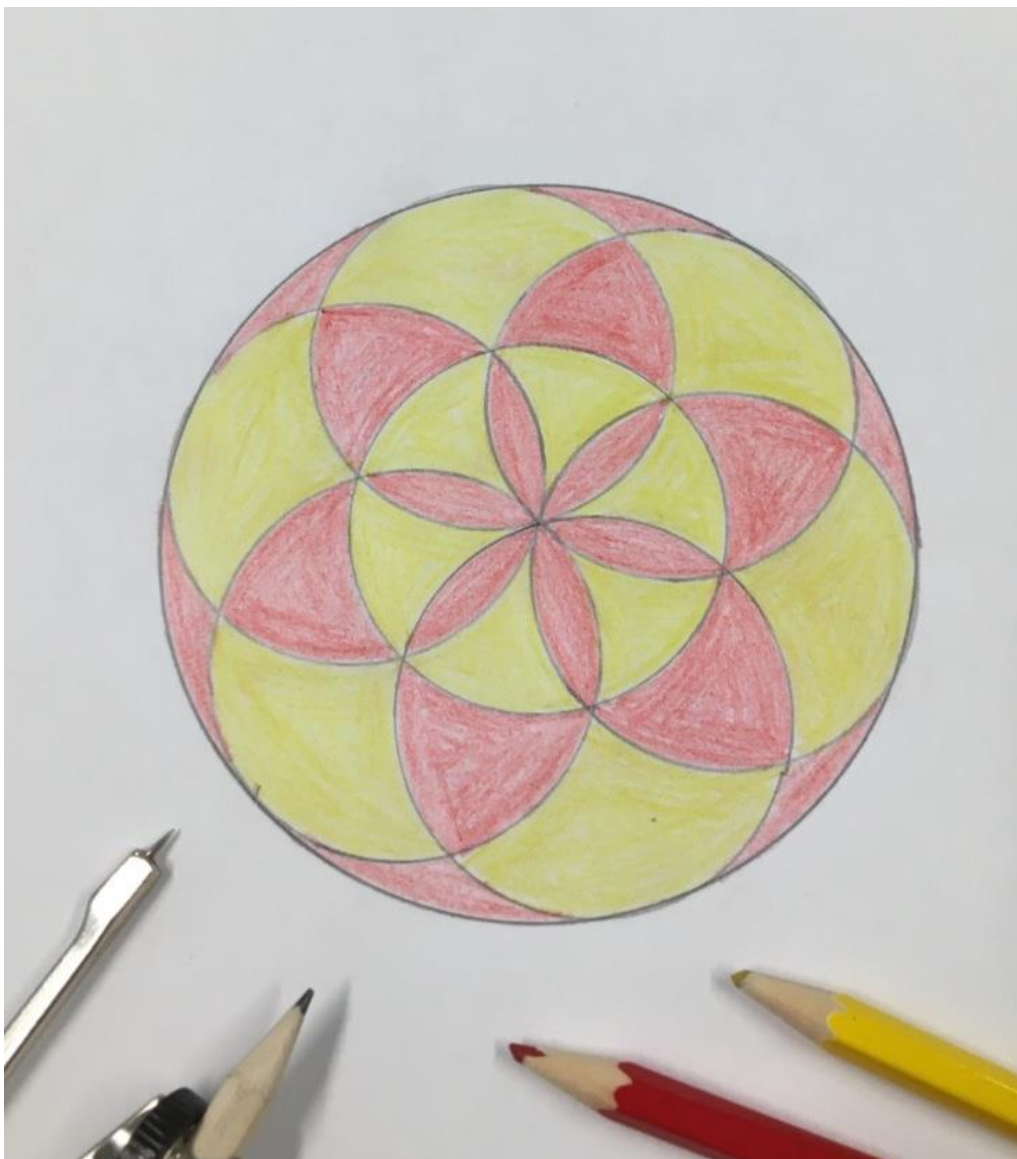


**Jonathan Hall** @StudyMaths · Jul 12


Tried to make a zero pair Mandala (as you do).


Gut instinct, which colour is there more of?


What's the ratio of red to yellow?



... and there was this (!):

 **Rob Southern** @mrsouthernmaths · Jul 18 ...  
And some of the best CPD I have EVER had has been hosting  
[#mathscpdchat](#)

 **Mary Pardoe** @PardoeMary · Jul 18 ...  
And WHAT an excellent host you have always been Rob! [#mathscpdchat](#)

 **Matt Man** @mr\_man\_maths · Jul 18 ...  
I echo this too Rob! Hosted for the first time in March and think I did three more after. So many great points to reflect and is brilliant for CPD too.  
[#mathscpdchat](#)

 **Kathryn MCCT** @Arithmaticks · Jul 18 ...  
SAME! I just get to nick everyone's ideas and amalgamate them into a mega plan... [#MathsCPDChat](#)



 **Mary Pardoe** @PardoeMary · Jul 18 ...  
54+ times hosting brilliantly Kathryn! You must have nicked quite a few ideas!!! 😊😊😊 [#mathscpdchat](#)

 **Kathryn MCCT** @Arithmaticks · Jul 18 ...  
Many many ideas! I always say that I don't have anything to write blogs about etc as none of the ideas really come from me... I just steal everyone else's! [#MathsCPDChat](#)

 **Mary Pardoe** @PardoeMary · Jul 18 ...  
We all do ... it's called learning!!! [#mathscpdchat](#)

In the next response to the third main question of this [#mathsCPDchat](#) ...

What is the best CPD you have done this year? How did it change your practice?

... Matt discusses how he has learnt by working with other teachers in 'delivering and receiving CPD' with teachers in other schools, and by working with colleagues in his own school:



**Matt Man** @mr\_man\_maths · Jul 18

...

For delivering CPD - I did the journey on simultaneous equations from primary right up to sixth form for @GLOWMaths #Mathsfest23 and @LaSalleEd #mathsconf32 #mathscpdchat



**Mary Pardoe** @PardoeMary · Jul 18

...

Really great! So interesting/instructive to investigate how concepts are developed both in teaching and in students minds as students mature ... as they move through time! #mathscpdchat



**Matt Man** @mr\_man\_maths · Jul 18

...

It really did push me out of my comfort zone and studied more about linking the Maths curriculum to all the key stages and listening to the view from both primary and secondary teachers. Lots of great feedback including one from @Kieran\_M\_Ed on one of the podcasts! #mathscpdchat



**Kathryn MCCT** @Arithmaticks · Jul 18

...

Oh lovely - could you show us a snippet of the timeline? #MathsCPDChat



**Matt Man** @mr\_man\_maths · Jul 18

...

Check my retweet #mathscpdchat



**Matt Man** @mr\_man\_maths · Jul 18

...

Check out this @Arithmaticks with the PPT on the journey of simultaneous equations from primary to sixth form. #mathscpdchat



**Matt Man** @mr\_man\_maths · Jun 26

[mrmanmaths.wordpress.com/2023/06/26/a-s...](https://mrmanmaths.wordpress.com/2023/06/26/a-s...)

Here is a brief summary of the workshop that I delivered for @GLOWMaths's #MathsFest23 and @LaSalleEd's #MathsConf32 with the PPT attached.

I'll deliver this again at some point in future Maths conferences so that more of you get to experience this!

(The link to Matt's summary of his workshop is in [the tweet](#) that [Matt](#) quoted.)




**Matt Man** @mr\_man\_maths · Jul 18

...

Receiving CPD - this is the TFM1 and TFM2 course by @Advanced\_Maths. It has been a saviour for me delivering A Level Further Maths (Pure elements!) Learning the material, networking with colleagues, doing the assignments whilst reflecting on misconceptions. #mathscpdchat



-  **Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...  
If these are the same quality as TAM, which I am certain they are. This is THE best CPD you can have. I recommend to everyone! #mathsCPDchat
-  **Anthony Shaw** @ShawMaths · Jul 18 ...  
The really are! All of the @MEIMaths @Advanced\_Maths extended CPD are amazing.
-  **Matt Man** @mr\_man\_maths · Jul 18 ...  
Yes I did TAM too from five years ago. Met great maths teachers including @PixiMaths! Highly recommend all CPD courses by @Advanced\_Maths especially if there are face to face sessions. #mathscpdchat
-  **Matt Man** @mr\_man\_maths · Jul 18 ...  
I'd also say the conversations that I have with Mel and Seager from @Just\_Maths is so invaluable. Sometimes, it's not all about whether CPD is good at that time. What makes quality CPD is the impact it gives say this time next year, or a couple of years time. #mathscpdchat
-  **Charlotte Hawthorne** @mrshawthorne7 · Jul 18 ...  
Thank you for saying this! You're so right! Some change can be a slow burner, or may take you time to do, but it's shifted your thinking nonetheless. #mathsCPDchat
-  **Kathryn MCCT** @Arithmaticks · Jul 18 ...  
Agreed. Someone once said to me that when you are in a CPD session you only really hear what you are ready for at the time. I've found more and more that things from years ago come back to me and suddenly feel more relevant. #MathsCPDChat
-  **Kathryn MCCT** @Arithmaticks · Jul 18 ...  
Also - professional discussion is SO underrated as a form of CPD! The things I have learned on here, and discussing with colleagues is just invaluable.  
@mrshawthorne7 and I do a debrief of our lessons on the phone on the way home most days haha!  
#MathsCPDChat
-  **Kathryn MCCT** @Arithmaticks · Jul 18 ...  
I also can't be too nice about him, as I've already hit my quota for the year with my tweets about him yesterday... but @StudyMaths always comes to my room like "OK, SO HOW CAN WE PUT THIS IN A COMPLETION TABLE" or similar. Been BRILLIANT CPD. #MathsCPDChat

The single replies to the third main question are shown next:

What is the best CPD you have done this year? How did it change your practice?



**Simon Ball** @ballyzero · Jul 18

...

@mrbartonmaths came to my workplace and spoke about how to get feedback from all students at once. It was excellent... but hasn't changed my practice yet, because it was after the students had left!  
[#mathscpdchat](#)



**Ben Rooney** @benjrooney · Jul 18

...

The outstanding TFM1 course from @Advanced\_Maths (lined up for TFM2) and a brilliant school session on questioning from @MrsR\_Sci that transformed how I do whole-class questioning.



**Joanne Green** @MsJoanneGreen · Jul 18

...

@mrshawthorne7 @Arithmatics [#mathscpdchat](#) @NCETM all of it! I attended The Royal Institution James Webb Space Telescope: A year in Solar System science event Friday. My questions were fantastic, so thank you to all of you lovely people who help to quench my academic hunger 🙌🍷



**Tayyub Majeed** @tm\_maths · Jul 18

...

I enjoyed maths conf, the whiterose maths conf (met you there in fact), and general reading on Twitter



**DMaths MCCT** @DeeVijayan · Jul 18

...

Late to the party and just catching up on [#mathscpdchat](#). The best cpd ever has been this community on Twitter. I wouldn't be the teacher I am if it wasn't for Twitter. Thanks to @PGCE\_Maths for introducing me to [#edutwitter](#)



**Jacob** @WonderingMaths · Jul 18

...

Doing CPD on teaching for mastery, we looked at Representation and Structure and I learned so much about how we use representations in real life for so many things to understand them. Money, drawings, music notation etc.

Really changed how I think about pictures!

[#mathscpdchat](#)

To the last question of the [#mathsCPDchat](#) ...



**Kathryn MCCT** @Arithmaticks · Jul 18

...

It's a biggie to end on here, so we are giving you a good chunk of time!

[@mrshawthorne7](#)

Looking to next year, give one thing from your practice that you will:

1. Keep 
2. Bin 
3. Improve 

[#MathsCPDChat](#)

... five teachers responded. Their replies are shown next:



**MrHawesMaths** @HawesMaths · Jul 18

...

Keep: OneNote/iPad use in the classroom

Bin: End of unit tests/markings

Improve: communication with parent AND student. [#mathscpdchat](#)



**Kathryn MCCT** @Arithmaticks · Jul 18

...

Oooh how are you binning marking!?!?!? [#MathsCPDChat](#)



**MrHawesMaths** @HawesMaths · Jul 18

...

Going for a more feedback focused approach and giving time in lessons to reflect/review work done. More peer/self marking. Only going to mark one assessment per term. Plus our subject strands are the focus.

[#mathscpdchat](#)



**Karen** @karenshancock · Jul 18

...

KEEP - Miniwhiteboards (Holepunched and in their folders, with nice thin pens so they can write loads)

BIN - (This is a hard one - after 26 years, I've binned a lot of things, but I'm not sure there's much else to bin.)

cont... [#MathsCPDChat](#)



**Karen** @karenshancock · Jul 18

...

IMPROVE - Looking to develop spot tests post homework to include two homework questions and one question similar to the homework but not identical.

[#MathsCPDChat](#)



**Emma Ball** @BallEmma1 · Jul 18

...

Keep: mini whiteboards and targeted retrieval starters

Bin: reliance on white rose worksheets

Improve: closing the gap pupil activities after end of unit assessments

[#mathsCPDchat](#)



**Mrs Zigmund** @CZigmond · Jul 18

...

1. SPARX ✓
  2. Half of my starter questions 🗑️
  3. Mini-whiteboard use in lessons 📈
- [#MathsCPDchat](#)



**BGodfrey** @LessaRiel · Jul 19

...

1. keep reducing examples students write down in favour of key well annotated examples
2. bin using ladies and gentlemen when trying to get attention
3. improve whiteboards and how they are integrated into the lesson

#### THE CLOSING MESSAGES FOLLOW



**Kathryn MCCT** @Arithmaticks · Jul 18

...

Woah, where did that hour go?! Thank you SO SO SO much for joining me and [@mrshawthorne7](#) this evening for the last [#MathsCPDChat](#) from [@NCETM](#).

We are so happy it was so busy and inspiring, as usual! You are all brilliant and have made this chat amazing for 10 whole years!



**Kathryn MCCT** @Arithmaticks · Jul 18

...

From a personal perspective, I want to say thank you so much to [@NCETM](#) for providing this platform for us all to discuss our ideas. And for asking me to host it for so many years. It means so much to me to be able to connect with the community like this.





**Kathryn MCCT** @Arithmaticks · Jul 18



**Charlotte Hawthorne** @mrshawthorne7 · Jul 18



Virtual one...yes! Maybe a group fist bump instead?! 🤝



**Joanne Green** ✓ @MsJoanneGreen · Jul 18



#mathscpdchat @mrshawthorne7 @Arithmaticks @NCETM Thank you guys here's your presents 🌸🌺🌻🌹🍋🍊🍌🍇🍉🥥🍓🍓



**Jacob** @WonderingMaths · Jul 18



Thank you for hosting a brilliant CPD chat! Great to connect with so many others and hear so many interesting things! #mathscpdchat



**Charlotte Hawthorne** @mrshawthorne7 · Jul 18



And tweet of the hour goes to... #mathsCPDchat



**Rob Southern** @mrsouthernmaths · Jul 18

Replying to @mrshawthorne7 and @Arithmaticks

And some of the best CPD I have EVER had has been hosting #mathscpdchat