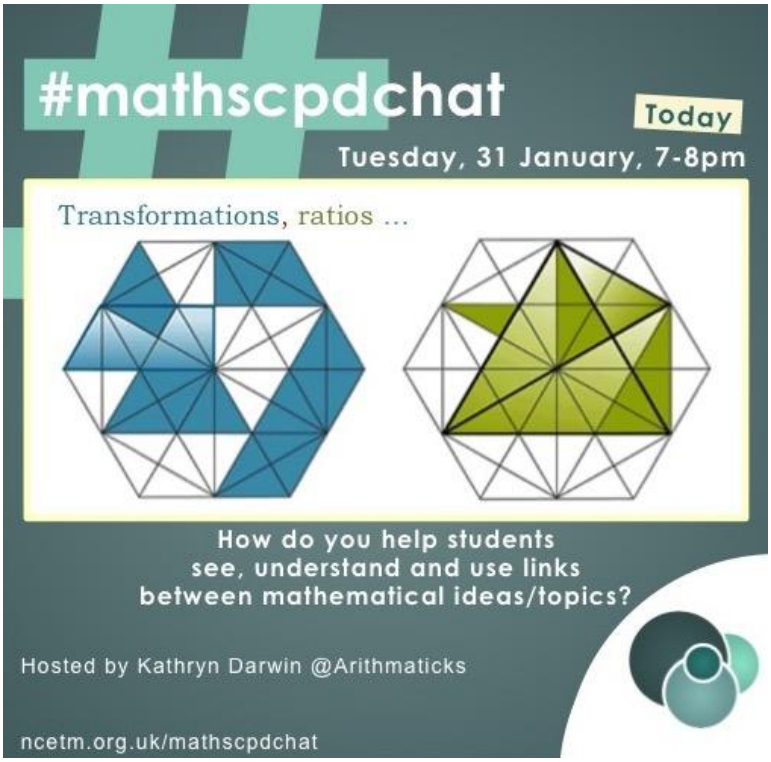
#mathscpdchat 31 January 2023

How do you help students see, understand and use links between mathematical ideas/topics?
Hosted by Kathryn Darwin

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:

Area, Parallelogram which is a Geogebra applet created by Mrs Rouse, Tim Brzezinski and Rebecca Pariso. Users are directed to transform triangles by moving corners and a slider. Below the applet are questions that are intended to lead users to reason to a conclusion about how the area of a triangle is connected to the area of the parallelogram of which it is half. It was shared by Karen Hancock

Underground Mathematics which is a website developed for students and teachers of post-16 mathematics by the University of Cambridge, and now hosted by Cambridge Mathematics. The vast collection of resources is designed to encourage all students to talk mathematically to each other and reflect on their own understanding while making connections within mathematics for themselves. It was shared by Mary Pardoe

Key Ideas in Teaching Mathematics which is the website for the book of the same name by Anne Watson, Keith Jones, and Dave Pratt. The book and the website comprise research-based guidance for teachers of mathematics of students aged 9 to 19. Many connections within mathematics are explored within them. It was shared by Mary Pardoe

Making Connections which is a page of the NRICH website containing links to four problems from Underground Mathematics. It was shared by Mary Pardoe

NCETM Secondary Magazine 79 which is an archived magazine containing an article *Focus on… paper folding*, images from which were shared during the discussion. It was shared by Mary Pardoe

NCETM Secondary Magazine 68 which is an archived magazine containing an article *Focus on… Quadrigon*, images from which were shared during the discussion. It was shared by Mary Pardoe

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

This was the host's welcome tweet:

Kathryn MCCT @Arithmaticks · 17h

Good evening everyone! Welcome to #MathsCPDChat!
We're going to be talking about connections today.
But just a reminder, before we begin that you need to make sure you are using the hashtag to help us track the conversation!

Kathryn's first main question …

Kathryn MCCT @Arithmaticks · 17h

So let's begin... What is your favourite connection to exploit in your maths teaching? How do you do it? #mathscpdchat

… generated two long discussions, one shorter conversation and many single replies. One of the long conversations developed from Peter Williams' observation that there are very many connections within mathematics, and focussed on his example, which was ratio tables:

Peter Williams @MathsImpact · 17h

Replying to @Arithmaticks

How can you choose, there are so many!

I think the connections that make the biggest difference are the models that underpin lots of different topics.

One I use often is ratio tables

#mathscpdchat

MrHawesMaths @HawesMaths · 17h

Replying to @MathsImpact and @Arithmaticks

A ratio table for a lot of work makes great connections. It provides good consistency too 😀 big fan! #mathscpdchat

Kathryn MCCT @Arithmaticks · 17h

Replying to @MathsImpact

You know I am a fan of the ratio table! What do you think is most useful about that representation in terms of conection making? #mathscpdchat

Jonathan Hall @StudyMaths · 16h

Replying to @Arithmaticks and @MathsImpact

Not sure if most useful, but I like to point out that the grid method is yet another example of a ratio table.
#mathscpdchat

$$12 \times 13 = 156$$

×	10	3
10	100	30
2	20	6

Jonathan Hall @StudyMaths · 21h

Replying to @StudyMaths @Arithmaticks and @MathsImpact

And that the times tables chart in their planner is just one MASSIVE ratio table. #mathscpdchat

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Kathryn MCCT @Arithmaticks · Jan 31

This is one of my favourite maths teaching hacks #MathsCPDChat

Peter Williams @MathsImpact · 21h

Replying to @StudyMaths and @Arithmaticks
#mathscpdchat

Kathryn MCCT @Arithmaticks · 21h

Replying to @MathsImpact and @StudyMaths

This meme was made for me! #MathsCPDChat

There were three quote-retweets of tweets included in the above conversation. The first quote-retweet (something technical seemed to have happened to it by the time of the screenshot), to which Kathryn replied later, was a quote-retweet of Richard Perring's comment …

Joanne Green @MsJoanneGreen · 17h

@LearningMaths #mathscpdchat @Arithmaticks What are DNLs?
I'm beginning to feel like I've invaded someone's private personal chat instead of attending an open conversation for people who like to discuss maths. The host hasn't provided an explanation of 'connections' and now DNLs.

You're unable to view this Tweet because this account owner limits who can view their Tweets. Learn more

Kathryn MCCT @Arithmaticks · Jan 31

Replying to @MsJoanneGreen and @LearningMaths

Sorry Joanne I seem to have missed some of your tweets today as quote tweets aren't showing up in my mentions without a tag.
By connections I mean links between topics! You've provided some good ideas of cross-curricular ones! **#MathsCPDChat**

… and the next quote-retweet was also from Joanne:

Joanne Green @MsJoanneGreen · 17h

@HawesMaths #mathscpdchat @Arithmaticks Today in Yr 7 music class, we used a clock face with hr numbers on. Pupils needed to place 4 beats on using different music notes semibreve etc., bbc.co.uk/bitesize/guide..
Music helps children to understand fractions [without saying 'maths']

MrHawesMaths @HawesMaths · 18h

Replying to @MathsImpact and @Arithmaticks

A ratio table for a lot of work makes great connections. It provides good consistency too 😀 big fan! #mathscpdchat

The third quote-retweet was posted later during the chat:

Kathryn MCCT @Arithmaticks · 20h

There's been some love for ratio tables for making connections between problems that have the same 'deep structure' but look different on the surface... What other representations allow us to make connections like this? #MathsCPDChat

Richard Perring @LearningMaths · 21h

Replying to @Arithmaticks and @MathsImpact

When I started using ratio tables and DNLs I found that it helped students see that what they perceived to be different topics were actually the 'same' maths #mathscpdchat

The other long conversation in response to the host's first main question …

Kathryn MCCT @Arithmaticks · 17h

So let's begin... What is your favourite connection to exploit in your maths teaching? How do you do it? **#mathscpdchat**

… developed from this comment about connections between linear sequences and linear graphs on Cartesian coordinate grids …

MrHawesMaths @HawesMaths · 17h

Replying to @Arithmaticks

I love doing nth term and y=mx+c. Essentially the same but different notations and mapping. #mathscpdchat

Vicky_Maths MCCT @vicky_maths · 17h

Replying to @HawesMaths and @Arithmaticks

I love this one! It always causes and oooohh! Moment too

Kathryn MCCT @Arithmaticks · 17h

Replying to @HawesMaths

Yes! This is something I have really got 'into' the past few years... @mrshawthorne7 has some lovely resources for that too! #mathscpdchat

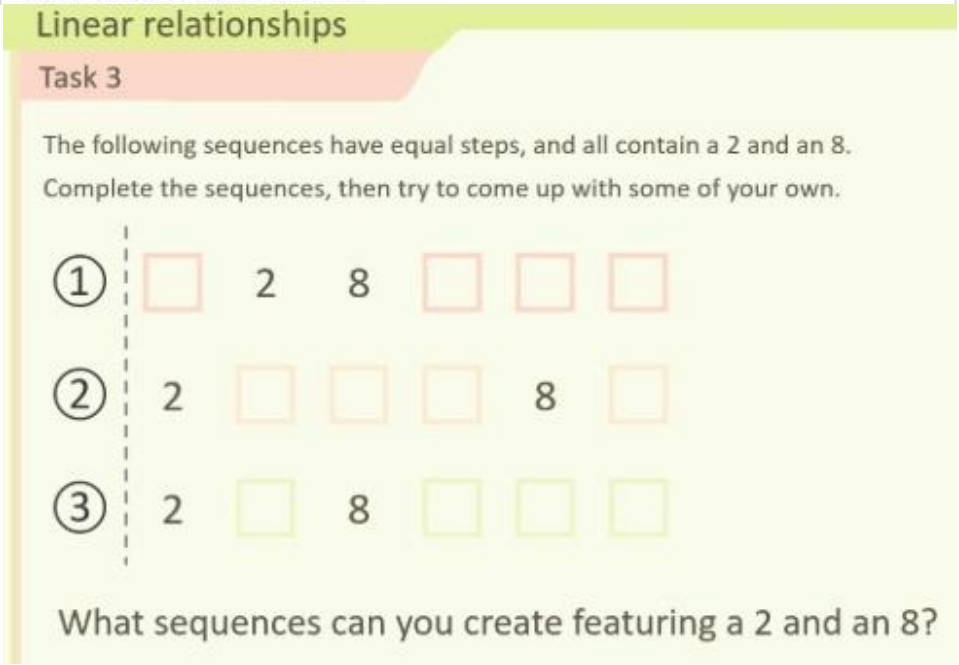
Charlotte Hawthorne @mrshawthorne7 · 17h

Replying to @Arithmaticks and @HawesMaths

I love this sequence of tasks so much.

Charlotte Hawthorne @mrshawthorne7 · Feb 28, 2021

Refined a few ideas I've had for a progression to connect sequences, nth term, gradient and the equation of a line. For my y10's when we are back face to face so there's obviously other modelling and talk going on around this.
Full task here:
SketchCPD.com/resources



Linear relationships

Task 4b

The following sequences have equal steps

Complete the sequences, then plot the position against the term on the graph opposite.

Draw a line through your points for each sequence.

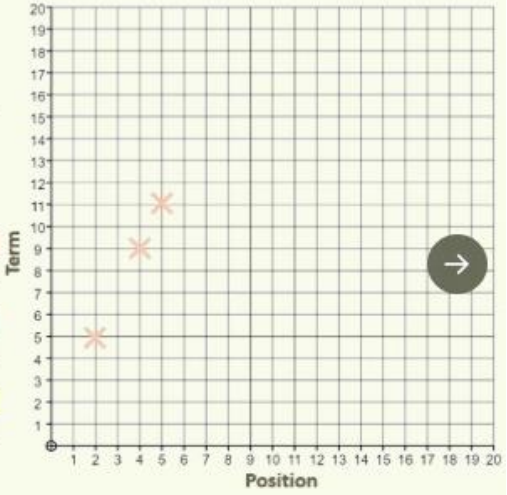
Position	1	2	3	4	5	6
Term		5		9	11	

②

Position	0	1		4	5	6
Term						32

③

Position	0		5		8	9
Term			12		18	

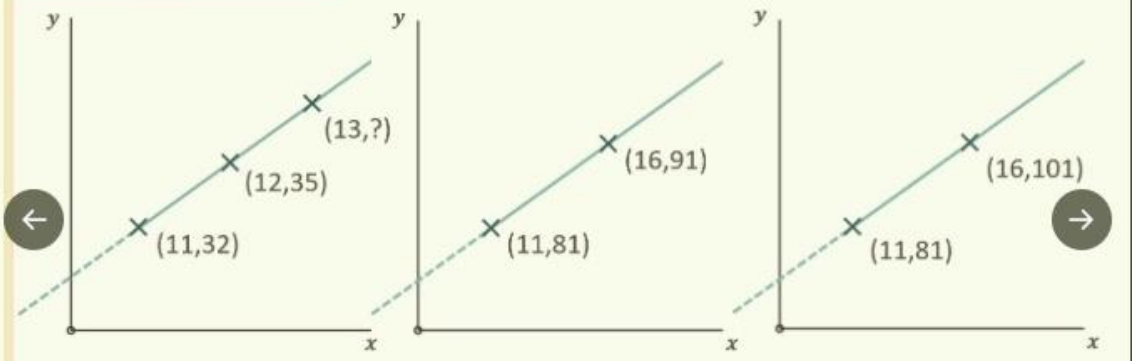


What features of the graph can you 'see' in the tables?

Linear relationships

Task 7

Fill in the gaps.



①

x	0	1			11		13
y						35	

②

x	0			10	11		16
y							

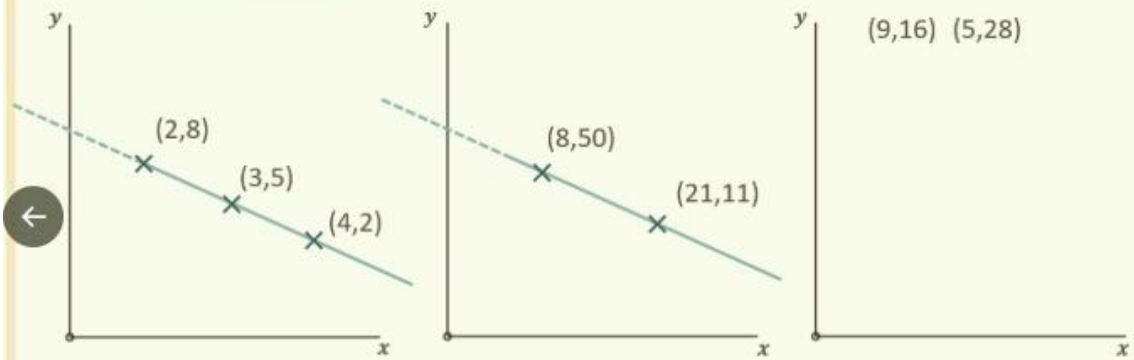
③

x	0			
y				

Linear relationships

Task 7 (continued)

Fill in the gaps. For the last one, roughly plot the points to check the slope



④

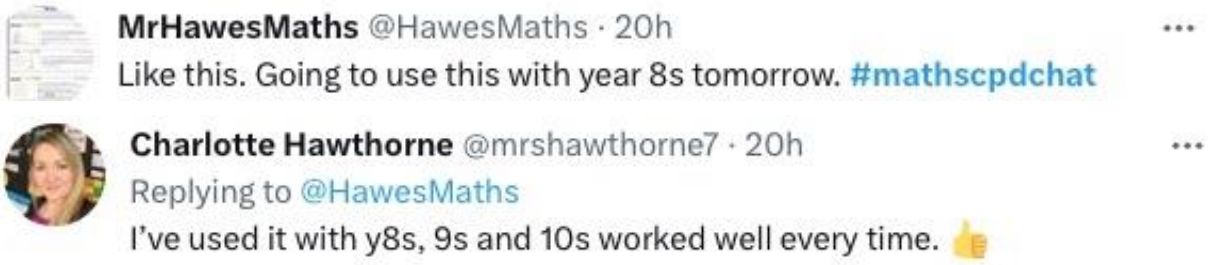
x	0	1	2	3	4
y			8		2

⑤

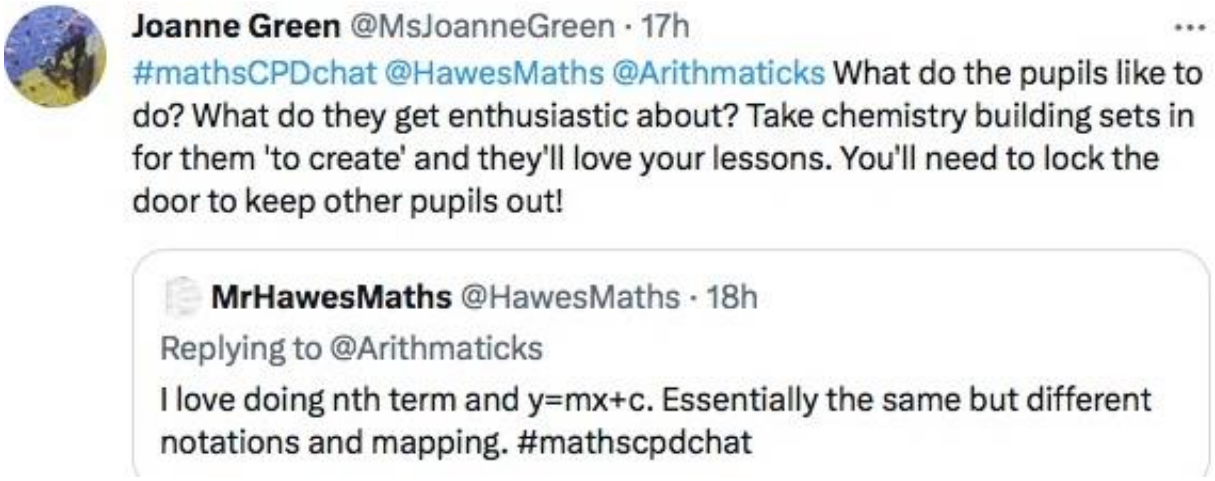
x	0			
y				

⑥

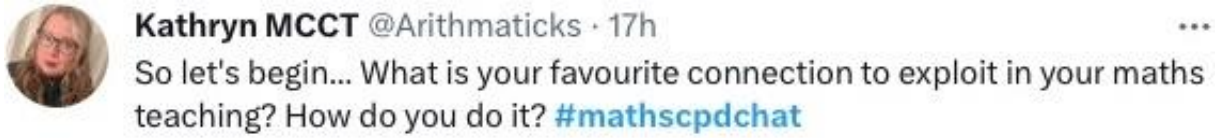
x	0			
y				



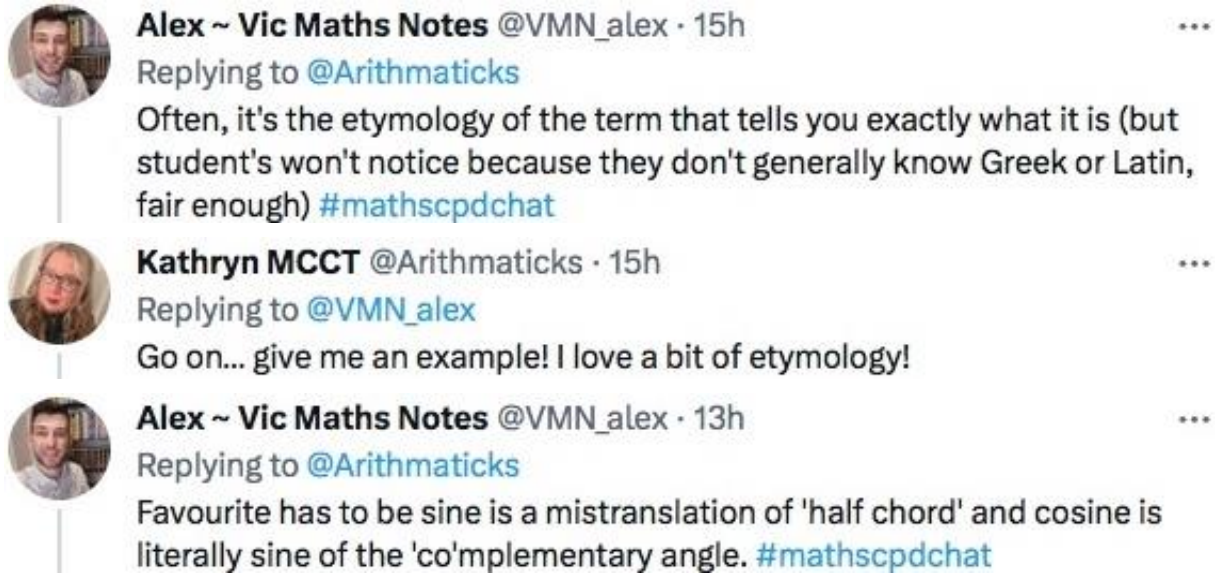
… and there was a quote-retweet of the Mr Hawes' tweet that had started the conversation:



The host's first question …



… also prompted the following shorter conversation …



John Bald @JohnBaldLangLit · 7h
Replying to @VMN_alex and @Arithmaticks
Thank you!

… and these 'single' (not developed-into or part-of conversations) replies:

Simon Ball @ballyzero · 17h
Replying to @Arithmaticks
That v = ds/dt is, in essence, speed = distance/time. I always point it out when we've established the link in Mechanics in the hope it establishes the direction of travel of calculus in the subject. #mathscpdchat

Kirsty Fish @Kirstymaths · 3h
Replying to @Arithmaticks
Unit circle! Trig, circles, triangles, Pythagoras... I get really carried away!

Louise @louisemaths · 16h
Replying to @Arithmaticks
I love teaching simultaneous eqns (elimination) and then plotting the graphs. Consistently blow their minds when they see they are solving where they intersect. Kind of feel I should start with graphical to reinforce the point of sim eqns, but love when the penny drops so much!

Adam Mercer @AMercerMaths · 14h
Replying to @Arithmaticks
Very late to the party but this year being better showing students how finding the angle in a pie chart is akin to calculating a percentage is akin to finding the area/arc length of a sector. "Look at all the proportion!!" #mathsCPDchat

Clayton @mrcstott · 16h
Replying to @Arithmaticks
Maybe not favourite but one I do regular is: 2 digit multiplication and expanding double brackets side by side using grid method.
eg. 64 x 52 and (6x+4)(5x+2) then talk about using base 10 and substitute x=10.

Mr Graham @MrGraham_Maths · 15h
Replying to @Arithmaticks
Similar shapes and dividing fractions. If A to B is x2, then B to A is divide by 2. Or x 1/2 if we want the SF. If A to B is x 2/5 then B to A is divide by 2/5, or x 5/2. Therefore shows that dividing by 2/5 is the same as x 5/2. Hope that makes sense, hard to explain in a tweet!

B H @Busstop87 · 4h

Replying to @Arithmaticks

Pythagoras instead of the distance formula.

Drew Sherratt @DrewSherratt23 · 14h

Replying to @Arithmaticks

Most recently so not favourites but- simplifying basic fractions using prime factors, relating this to algebraic fractions and why you can't cancel terms until all terms are being multiplied. Coordinates and vectors the connections and the key differences...

Gurdeep Singh @TheTeacherWins · 11h

Replying to @Arithmaticks

So many 😊

In GCSE Stats we do standardised scores (score - mean)/st dev.

Then in A Level we do normal distribution Z-values (x - u)/sigma.

Exactly the same thing and a wow moment when they realise.

Gurdeep Singh @TheTeacherWins · 11h

Replying to @Arithmaticks

Can't remember the formula for density?

What's the units in the question? That tells you what you divide by what.

The same for speed etc.

Adam Mercer @AMercerMaths · Jan 31

Replying to @Arithmaticks

Very late to the party but this year being better showing students how finding the angle in a pie chart is akin to calculating a percentage is akin to finding the area/arc length of a sector. "Look at all the proportion!!"

#mathsCPDchat

Finally (for the host's first main question) there was this reply to it in the form of a quote-retweet:

Joanne Green @MsJoanneGreen · 17h

#mathscpdchat @Arithmatics My apologies, I don't understand what you mean by exploit. I follow methods and structured so the equals sign, = , is in a vertical column resulting in a line being needed sometimes on each A4 page. Maths books are not rhinostationery.com/rhino-8-x-4-ex shape.

Kathryn's next main question …

Kathryn MCCT @Arithmaticks · 18h

What is the "most obvious" connection in our curriculum, in your opinion? Why do you think it is useful? **#mathsCPDchat**

… generated two 'conversations'. This, which was a reply to the first question, the other responses to which are shown above …

James Maloney @JamesWMaloney · 18h

Replying to @Arithmaticks

FDP and it's my favourite to exploit (from your last question.) #MathsCPDChat

Kathryn MCCT @Arithmaticks · 18h

Replying to @JamesWMaloney

How do you teach it to make the links obvious to students too? #mathscpdchat

… and this:

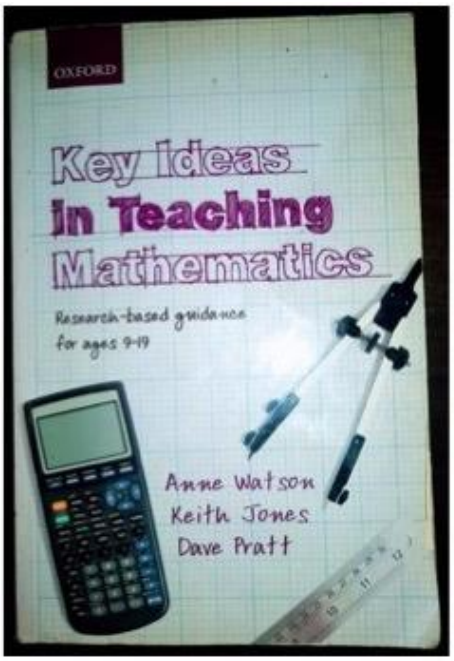
Mary Pardoe @PardoeMary · 18h

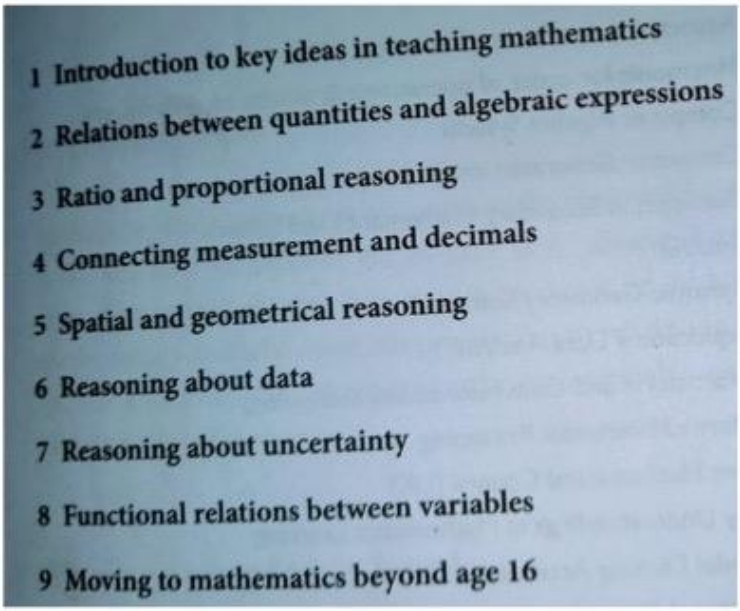
Replying to @Arithmaticks

Trig depends on many connections. This is from 'Key Ideas in Teaching Mathematics' which has it's own website (from which you can reach the book) here: nuffieldfoundation.org/students-teach... #mathscpdchat

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 fraction; how to manipulate a multiplicative relationship; what 'sin' (etc.) means as a symbolic representation of a function and so on. Thus knowing about ratios can support learning trigonometry, but if the understanding of 'ratio' is limited to mixing cake recipes it won't help much. To be successful, students have to have had enough experience to be fluent, and enough knowledge to use methods wisely.

200 | KEY IDEAS IN TEACHING MATHEMATICS





Kathryn MCCT @Arithmaticks · 18h

Replying to @PardoeMary

I love this book! Such a valuable resource for ideas like this #MathsCPDChat

For some reason this comment was posted as a reply to the tweet about 'Key Ideas in Teaching Mathematics':

Joanne Green @MsJoanneGreen · 17h

@Arithmaticks #mathscpdchat Because there's no maths resources for pupils to build volume, area, etc., I let pupils play with chemistry sets i.e., cochranes.co.uk/show_product.a... This kit contains bond angles for geometric understanding. Chemistry and maths work together. Fund science!

Kathryn's third main question …

Kathryn MCCT @Arithmaticks · 19h

How do you 'set up' your lessons so students see the connections? Do you plan to help students to make these connections themselves? Or do you make them obvious through your instruction? #mathscpdchat

… prompted this report of practice …

James Maloney @JamesWMaloney · 19h

Replying to @Arithmaticks

Give them chance to see them themselves, but I will make them obvious if necessary. Then give them opportunity to play around with those connections to strengthen them. #MathsCPDChat

Kathryn MCCT @Arithmaticks · 19h

Replying to @JamesWMaloney

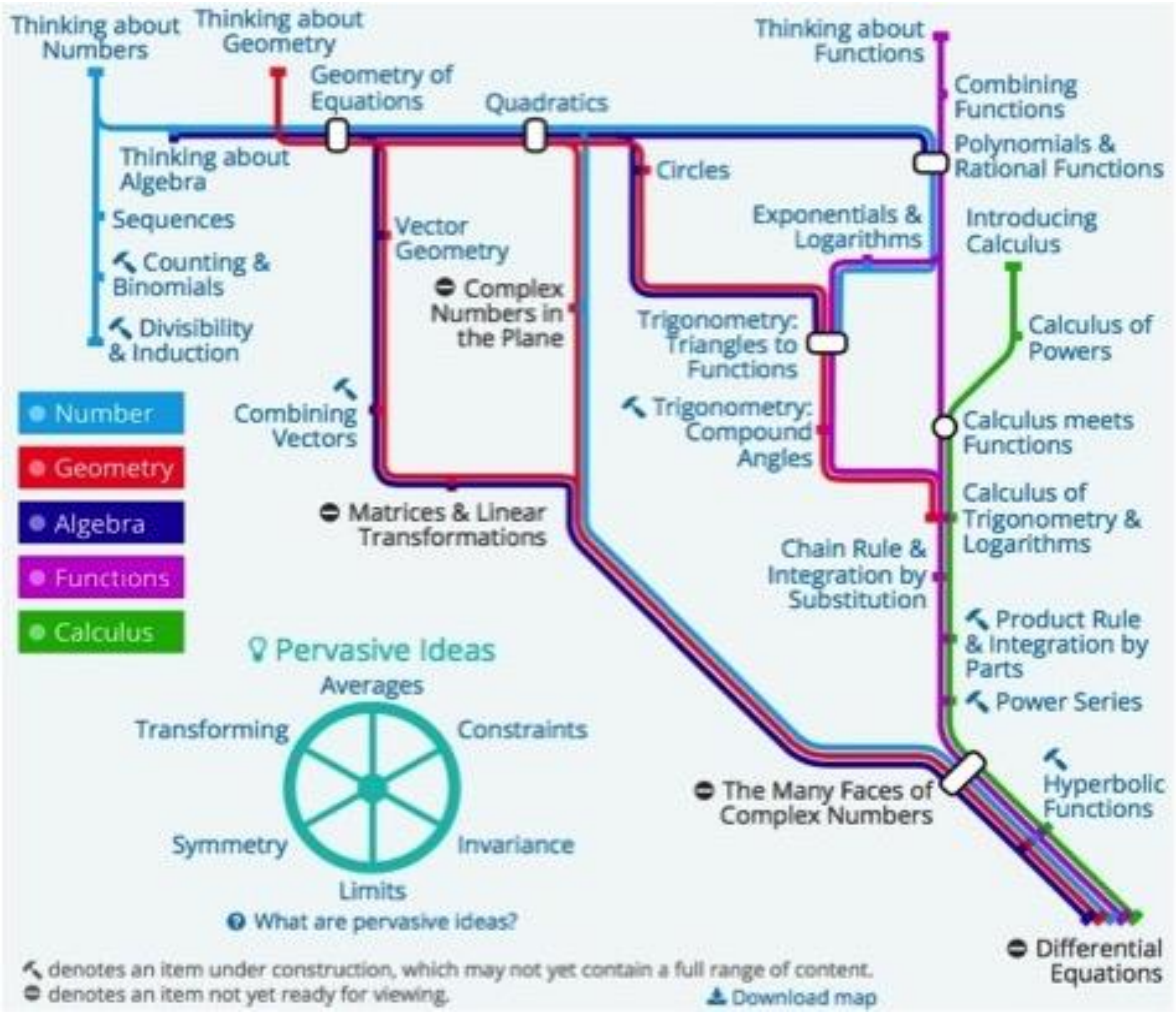
Do you have any particular tasks you use to do this? #mathscpdchat

… this reminder about a useful 'treasure trove' of material (link provided at top of summary) …

Mary Pardoe @PardoeMary · 19h

Replying to @Arithmaticks

Underground Mathematics (undergroundmathematics.org) are very helpful in providing tasks and mathematical situations/challenges in which students see/use links!
#mathscpdchat



underground mathematics

We hope the resources will encourage all students to talk mathematically to each other and reflect on their own understanding.

The resources are designed to be used in such a way as to

- give students the opportunity to think mathematically;
- support students in developing their own understanding;
- invite students to make connections for themselves;
- nurture students' mathematical independence, and
- help students to develop resilience, flexibility and creativity.

Making connections

Mathematics is a coherent and connected enterprise. To reflect this we have organised our resources along a system of thematic tube lines.

These resources support teachers in the classroom. They help students build firm foundations for mathematical understanding by connecting ideas and developing techniques.

This approach to post-16 mathematics was developed by the University of Cambridge, funded by a grant from the UK Department for Education. The resources are free for all users. The website is now hosted by Cambridge Mathematics.

Kathryn MCCT @Arithmaticks · 19h

Replying to @PardoeMary

I forgot this existed... treasure trove! #MathsCPDChat

… with an example of a task and a snippet from the material provided to support students working on that task:

Mary Pardoe @PardoeMary · 19h

Replying to @PardoeMary and @Arithmaticks

For example, this Underground task is also featured on NRICH here:
nrich.maths.org/12818
#mathscpdchat

Trigonometry: Triangles to Functions

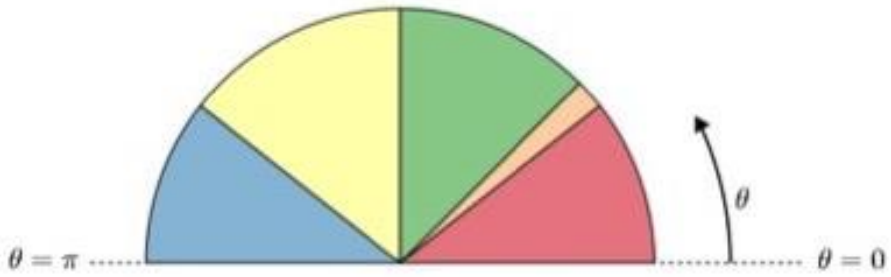
Many ways problem

Slices of π ☆

Printable/supporting materials Fullscreen mode Teacher notes Resource in action Teacher support

Problem | Things you might have noticed

Take a look at the diagram below.



We've used inequalities involving $\sin\theta$, $\cos\theta$ and $\tan\theta$ to divide the semicircle into sectors.

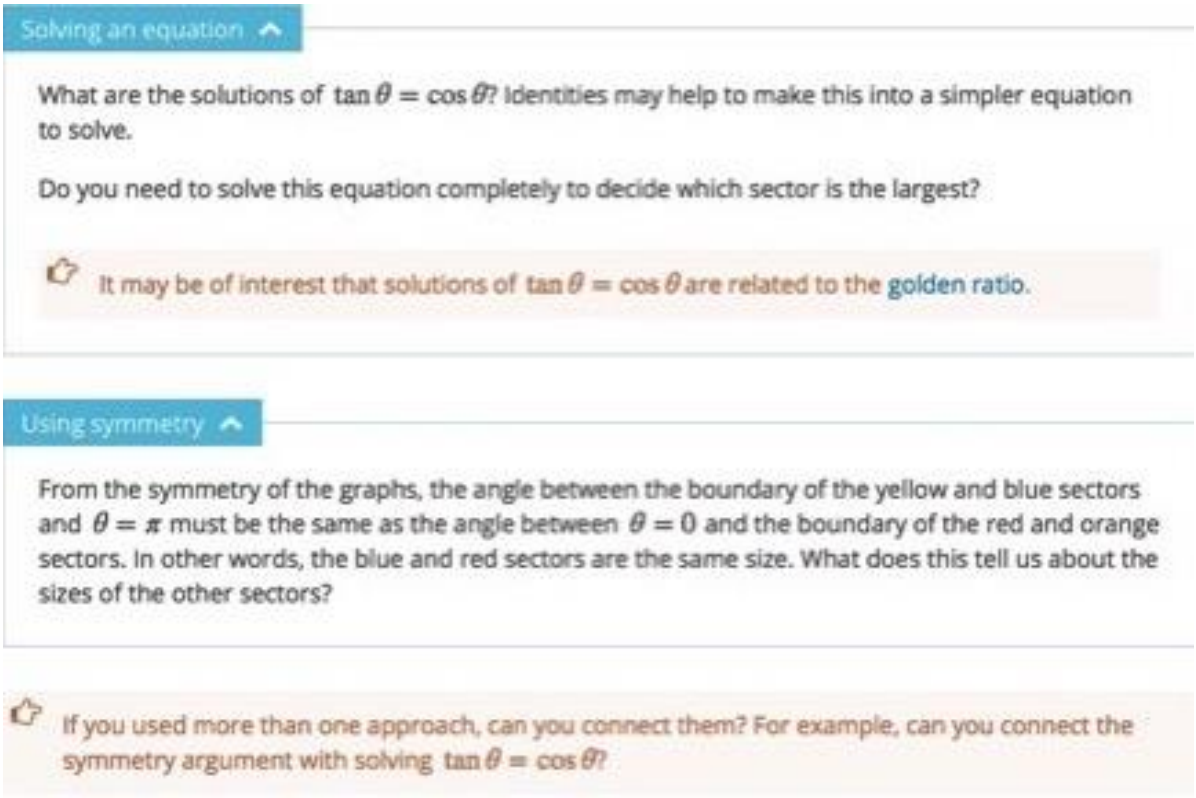
Each sector in the diagram is defined by a different inequality.

For example, one sector is defined by the angles θ between 0 and π for which $\cos\theta < \sin\theta < \tan\theta$.

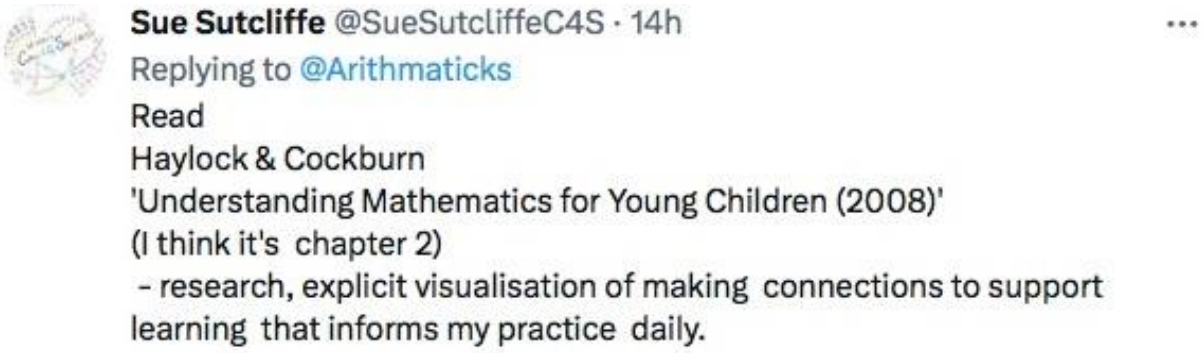
Another sector is defined by $\cos\theta < \tan\theta < \sin\theta$.

Questions

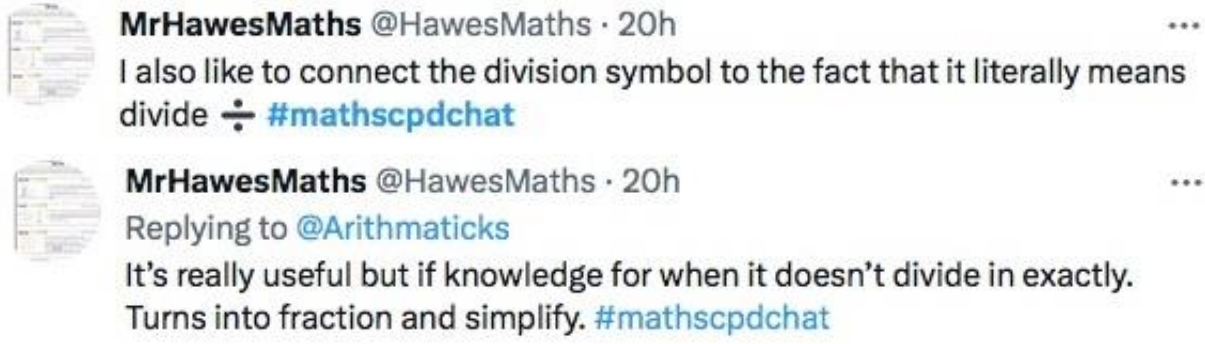
- Can you work out which inequality has been used to define each sector?
- Which is the biggest sector?
- If you extended the diagram to make a complete circle, how many extra sectors would you need?



There was also this 'single' reply to Kathryn's third question (about strategies teachers use in lessons to support students in seeing connections):



Matt Hawes generated the following conversation about the division symbol when he posted two comments that were not replies to any question from the host:



Maths Lead Prac @mathsleadprac · 19h
Replying to @HawesMaths
I love this, so simple yet so powerful

Kathryn MCCT @Arithmaticks · 20h
Replying to @HawesMaths
I like that urban myth that it means 'a number over a number' and was made small to fit on a calculator button... #mathscpdchat

Hannah @missradders · 20h
Replying to @Arithmaticks and @HawesMaths
Hush. It's true.

Andrew Stacey (@loopspace@mathstodon.xyz) @mathforge · 19h
Replying to @Arithmaticks and @HawesMaths
You mean that's /not/ true??

Have I been lying to my students all this time??

Kathryn MCCT @Arithmaticks · 19h
Replying to @mathforge and @HawesMaths
Maybe it is true... I was told it... #MathsCPDChat

Several single replies/comments, about compound measures and units, were prompted by another tweet to this #mathsCPDchat that was not a reply to any particular question from the host, as shown next:

CantabKitty @CantabKitty · 20h
Not sure if this is what you mean but I like to point out that the formula for s=d/t is literally contained in that most commonly seen speed "mph". Also other formulas needed in exam eg pressure etc. just look at the units.
#mathscpdchat

Shirley Anne @Penda205 · 9h
Replying to @CantabKitty
This helped me lots with my Alevel Chemistry!

Emily Rae @ECR_Maths · 20h
Replying to @CantabKitty
Looking at the units is also helpful in connected rates of change at A Level. For example, if the rate is given in "cm^2/sec" then you know the rate of change will be dA/dt.

Kathryn MCCT @Arithmaticks · 20h
Replying to @CantabKitty
Yes! I also love this one... it feels like such a life hack! #mathscpdchat

Richard Dare (parody) @dare_richard · 7h
Replying to @CantabKitty
If only we also said the mean number "per person" consistently.

Price "per gram"

Etc.

Linking these direct proportion concepts.

Peter Williams @MathsImpact · 20h
Replying to @CantabKitty
Look at the units is always good advice for compound measure questions.

Naomi Bowler @naomibowler17 · 18h
Replying to @CantabKitty
Mph is literally how i remember how to calculate speed 😄

Christian Kitchen @kitchy2k · 20h
Replying to @CantabKitty
Density questions always give units so same

Philip Hammond @PhilipHammond1 · 18h
Replying to @CantabKitty
I tell my pupils this all the time

Liz @ljrn42 · 19h
Replying to @CantabKitty
I just can't get the kids to engage with that though-they "just don't get it"

Ian @teachingofsci · 3h
Replying to @CantabKitty
Not sure what this is in response to, but my colleague @DocWhalley's session on "The power of PER" is great.

Matt Hawes also made the following comment to the #mathsCPDchat 'generally' …

MrHawesMaths @HawesMaths · Jan 31

Other elements I like to connect are using prime factors to do division (through cancelling) and also the fact that the 'bus stop' is an area model where dividend is area and divisor is one length of rectangle = 🤯 #mathscpdchat

Kathryn MCCT @Arithmaticks · Jan 31

Replying to @HawesMaths

I remember realising that about the 'bus stop' and just wanting to tell EVERYONE I have ever met #MathsCPDChat

Conyers Maths @ConyersMaths · Jan 31

Replying to @HawesMaths

Yes, saw the area idea on a course with @EmathsUK and it really stuck. Works nicely with algebra tiles too

… and he shared this view 'generally':

MrHawesMaths @HawesMaths · Jan 31

Laws of indices and the 'why' we add/subtract/multiply the powers. is a nice one to explain how manipulating algebra works #MathsCPDChat

The host's next main question …

Kathryn MCCT @Arithmaticks · Jan 31

What links do you think we most commonly 'miss' when teaching? How should we expose and use them? #MathsCPDChat

… drew attention to teaching about ways of writing numbers …

Charlotte Hawthorne @mrshawthorne7 · Jan 31

Replying to @Arithmaticks

Standard form, significant figures and place value. Standard form could be seen as the value of the first significant figure. If we take something like 3450000 the 3 is millions so we have 3.45 million, million is 10 ^6 so 3.45 × 10^6 #mathsCPDchat

Kathryn MCCT @Arithmaticks · Jan 31

Replying to @mrshawthorne7

I looooooooove this! #MathsCPDChat

WBarrassHemmens @wsbarhem · Jan 31

Replying to @mrshawthorne7 and @Arithmaticks

I would add to this that we should also teach engineering form as it ties more closely to the place values, as it only uses the major place values as powers of 10.
312 million = 312 × 10^6
It is a great introduction for students before moving to traditional standard form.

… and to the division symbol again …

Will Roberts @WRoberts3 · Jan 31

Replying to @Arithmaticks

An obelus ÷ asks you to replace its dots by the adjacent numbers to form a fraction.

Kathryn MCCT @Arithmaticks · Jan 31

Replying to @WRoberts3

We talked about this one! We wondered if it was just urban legend...

Will Roberts @WRoberts3 · Jan 31

Replying to @Arithmaticks

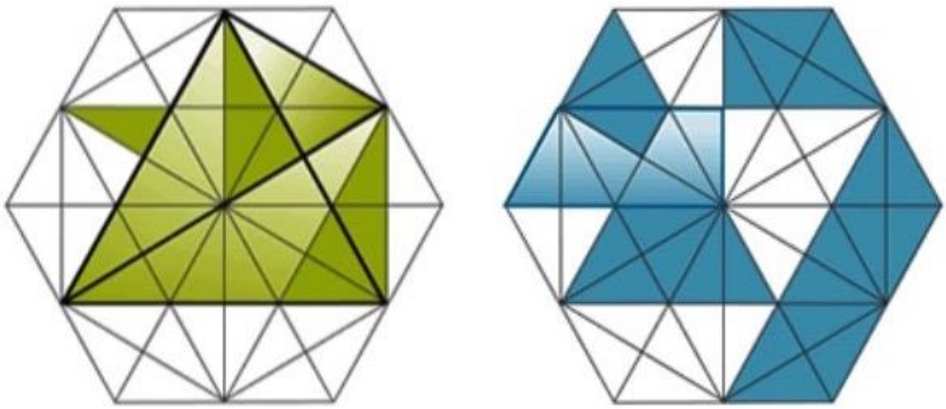
Can't be; I'm not urban enough to know it in that case.

… and to an image that some teachers have found provides opportunities for students to think about connections between mathematical ideas:

Mary Pardoe @PardoeMary · Jan 31

Replying to @Arithmaticks

I found this image (Quadrigon) in a copy of MT years ago ... then I used it loads, and pupils saw many often-missed links between transformations and ratios and trig. I wrote about it a bit in 'Quadrigon' here: ncetm.org.uk/media/1o5fq3xm.
#mathscpdchat



To the next main question from Kathryn …

Kathryn MCCT @Arithmaticks · Jan 31

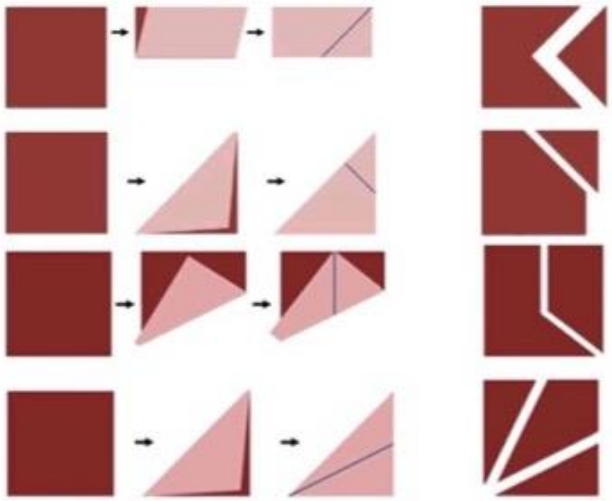
What topics do you struggle to 'make connections' with? #mathscpdchat

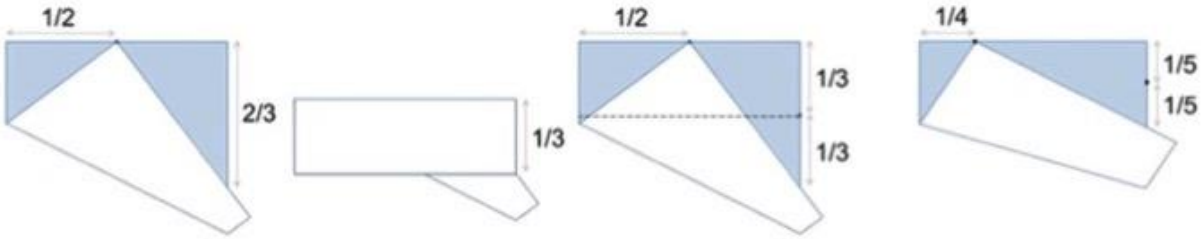
… there was only one reply:

Mary Pardoe @PardoeMary · Jan 31

Replying to @Arithmaticks

Fractions and properties of shapes (not BITS/PARTS of shapes) is an usual one … but cutting/folding sheets of paper tasks can focus on that … e.g. I wrote something about that here (paper folding): ncetm.org.uk/media/jkod521k. #mathscpdchat





The following question, directed 'generally' at the chat, prompted a teacher to describe the double number line as 'the pictorial gateway to a ratio table':

Andrew Stacey (@loopspace@mathstodon.... @mathfo... · Jan 31

Keep seeing "DNL", what's a "DNL"?

#mathscpdchat

Charlotte Hawthorne @mrshawthorne7 · Jan 31

Replying to @mathforge

Double number line. #mathsCPDchat

Andrew Stacey (@loopspace@mathstodon.... @mathfo... · Jan 31
Replying to @mrshawthorne7
Ah, thanks!

So that's ... another name for a ratio table, right?

Hywel Pugh @MrHPugh · Jan 31
Replying to @mathforge and @mrshawthorne7
The pictorial gateway to a ratio table in most cases.

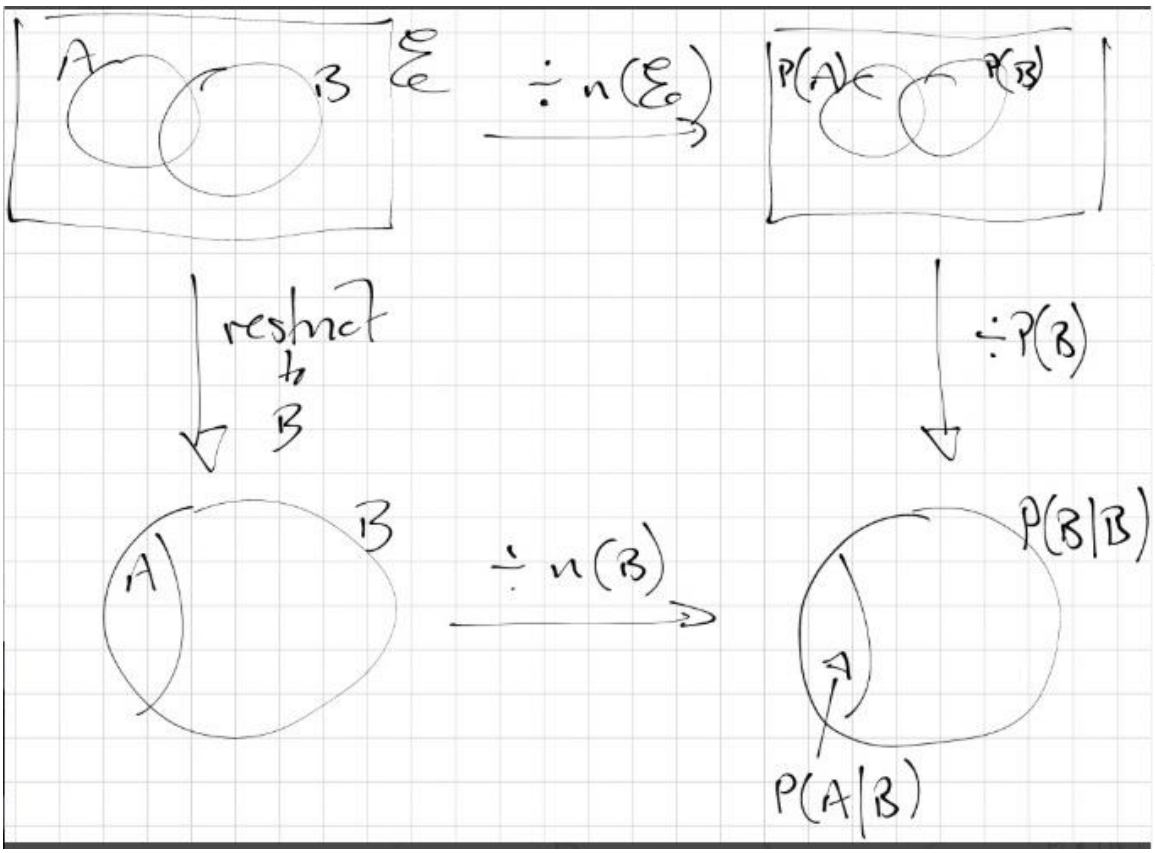
The same contributor extended this theme by asking another question generally (although it would have fitted as a response to the host's question about commonly-missed links):

Andrew Stacey (@loopspace@mathstodon.... @mathfo... · Jan 31
How about, conditional probability is a ratio table?

#mathscpdchat

Kathryn MCCT @Arithmaticks · Jan 31
Replying to @mathforge
Do elaborate? #MathsCPDChat

Andrew Stacey (@loopspace@mathstodon.... @mathfo... · Jan 31
Replying to @Arithmaticks



Hywel Pugh @MrHPugh · Jan 31
Replying to @Arithmaticks and @mathforge
Probability in general is a ratio table.

Expected successes.	Trials
Prob of success.	1 trial.

For expectation or experimental probability.

Hywel Pugh @MrHPugh · Jan 31
Replying to @MrHPugh @Arithmaticks and @mathforge
Expected successes replaced with actual successes for experimental probability.

Conceptual difficulty is in thinking that the probability of success is the number of successes for 1 trial.

It can also help to go deep on the terminology of relative frequency

There were no replies to the tweet in which the host asked her last question …

Kathryn MCCT @Arithmaticks · Jan 31
10 mins to go... just enough time for you to share your favorite 'link-making' resource with us! #mathscpdchat

… probably because contributors were still busy replying to her earlier questions.

Matt Hawes tweeted another comment generally to the chat …

MrHawesMaths @HawesMaths · Jan 31
The area for a triangle is half the rectangle. The area for trapezium is half a parallelogram and area of a circle is based on a rectangle. More 🤯🤯🤯🤯 #MathsCPDChat

MrHawesMaths @HawesMaths · Jan 31
Replying to @HawesMaths
I know that could be considered an intraconnection #mathscpdchat

… and so generated the following conversation about seeing some connections between areas of shapes:

Jshm @jshmtn · Jan 31
Replying to @HawesMaths
Area of triangle is half the parallelogram for me 👀

MrHawesMaths @HawesMaths · Jan 31

Replying to @jshmtn

Ooh. I like the sound of that. Links nicely with the parallelogram at the centre.

Triangle ➡️ parallelogram ➡️ trapezium #mathscpdchat

Peter Williams @MathsImpact · Jan 31

Replying to @jshmtn and @HawesMaths

Which is great because it works for any triangle, whereas half a rectangle only works for right angled triangles.

Peter Williams @MathsImpact · Jan 31

Replying to @MathsImpact @jshmtn and @HawesMaths

Also far more convincing that it still works for triangles which "overhang" the perpendicular height.

MrHawesMaths @HawesMaths · Jan 31

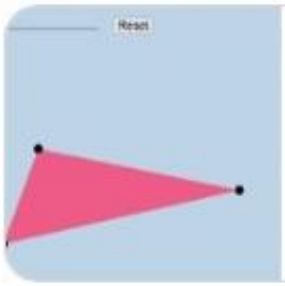
Replying to @MathsImpact and @jshmtn

I've always drawn a rectangle around the triangle. That's about to change....

Karen @karenshancock · Jan 31

Replying to @HawesMaths @MathsImpact and @jshmtn

This is a nice demonstration



geogebra.org

Area of a Triangle interactive (cf parallelogram)

Applet allows for the student to meaningfully discover the formula for the area of a triangle ...

Jshm @jshmtn · Jan 31

Replying to @HawesMaths

I think it's hard for students to visualise a rectangle around some of the weirder looking triangles but it can be easier for them to recognise it's half a parallelogram as the parallelogram is slanted

Hywel Pugh @MrHPugh · Jan 31

Replying to @jshmtn and @HawesMaths

Particularly those with an obtuse angle at one end of the base

The host's closing tweet …

Kathryn MCCT @Arithmaticks · Jan 31

Thank you so much for all your contributions tonight! I have thoroughly enjoyed talking maths with you, as usual!
Look out for the summary & I'll speak to you again soon!
#MathsCPDChat

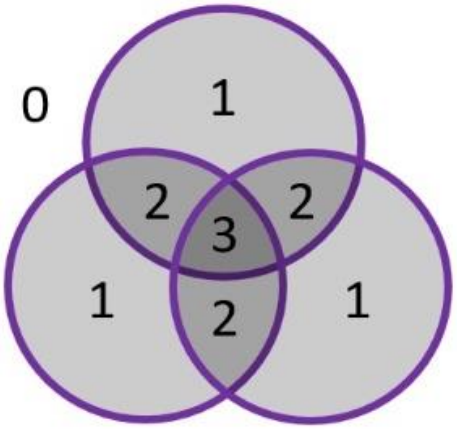
… prompted the sharing of an observation …

Jonathan Hall @StudyMaths · Jan 31

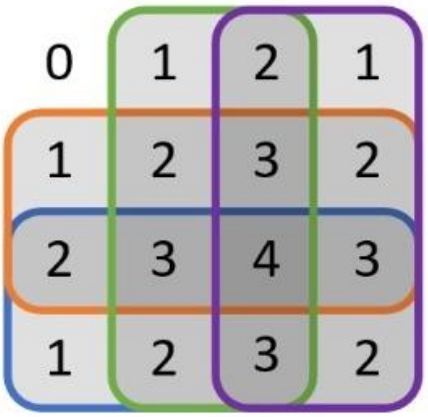
Replying to @Arithmaticks

Is it too late to post this? #mathscpdchat

> **Jonathan Hall** @StudyMaths · Nov 22, 2022
>
> I never realised (until yesterday) that the number of intersections in a Venn diagram follows Pascal's triangle.



Intersections	0	1	2	3
Frequency	1	3	3	1



Intersections	0	1	2	3	4
Frequency	1	4	6	4	1

Kathryn MCCT @Arithmaticks · Jan 31

Replying to @StudyMaths

This was a great CPD session 👏

Andrew Stacey (@loopspace@mathstodon.... @mathfo... · Jan 31

Replying to @StudyMaths and @Arithmaticks

Oddly enough, I was going to post that each row in the binomial triangle is a ratio table ...