

Preparing for September

A Webinar for Maths Teachers

August 2020

Jo Morgan

@mathsjem

**Have a go at
this while
you wait!**

**We'll start
at 3pm.**

**Can you find six consecutive integers
that will fit into these boxes in order?**

Prime	Factorial	Square	Even	Cube	Triangle

What about these six boxes...?

Cube	Prime	Odd	Square	Fibonacci	Factorial

Today...

- ✓Pandemic Pedagogy
- ✓Lesson planning processes
- ✓Resources
- ✓Getting organised
- ✓Questions!

If you find the chat distracting, you can move the chat window off your screen.

If you have a question for me at the end please put it in the Q&A, not the chat.

**What classes
you'll be
teaching?**

**What topics
you're starting
with?**

**Before we start,
do you know...**

**What new
routines and
restrictions will
be in place?**

**Where you'll
be teaching?**

**'Nomadic'
teachers**

**Supporting at
a distance**

**What's
different?**

Curriculum?

Groupings

Handouts?









**Leave
classrooms
tidy!**

**Wipe the
board before
you leave.**

Starting lessons

Arrive (students are waiting in room)



Write starter task on whiteboard. Students start work.



Login, do register, get lesson ready to go

Arrive (students are waiting in room)



Have a student hand out starter sheet. Students start work.



Login, do register, get lesson ready to go

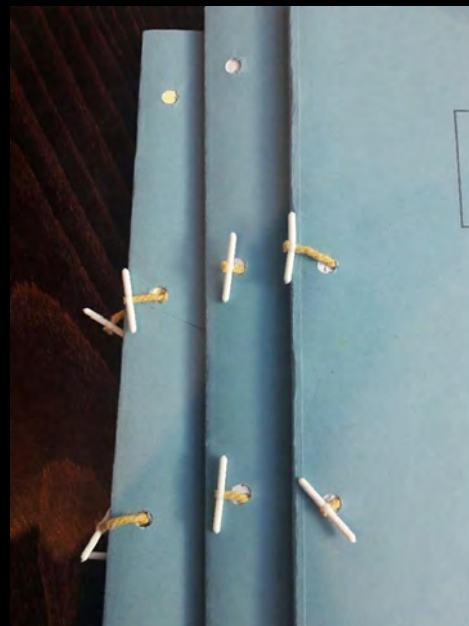
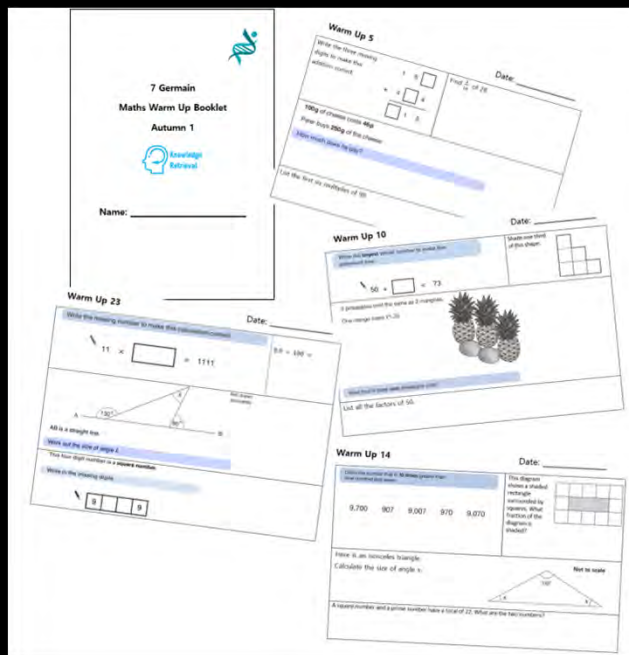
Start of term: issue a starter booklet to each student.



Arrive (students are already working on starter)



Login, do register, get lesson ready to go



<https://www.resourceaholic.com/2020/07/warm-up-booklets.html>

Name: _____ 5-a-day Higher Plus

28th July

Here are the first 5 terms of a quadratic sequence

24 30 38 48 60

Find an expression, in terms of n , for the n th term of this quadratic sequence

A solid sphere has a diameter of 12cm.
The sphere is made from glass.
The density of the glass is 2.97g/cm^3

Find the mass of the glass sphere.

Solve

$x^2 + 9 > 10x$

A circle has equation $x^2 + y^2 = 106$

Work out the length of the diameter.

A group of scientists want to estimate the number of pets in a lake.
They catch and ring 400 eels.
They return the 400 eels to the lake.
They then catch 700 eels.
Of these, 16 are ringed.

Estimate the number of e lake.

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Name: _____ 5-a-day Higher

28th July

There are 5 red and 5 green counters in a bag.

Kellie takes out a counter, replaces it and takes out another.

What is the probability of two reds?

On the grid, clearly label the region which satisfies all three inequalities below

$x > 0$ $y \leq 1.5x$ $x + 2y \leq 4$

A is a point on two circles.
The smaller circle is inside the larger circle.

The radius of the smaller circle is r cm.
The radius of the larger circle is 2cm greater than the radius of the smaller circle.
Show that the radius of the smaller circle is $\frac{5}{8} - 1$ cm.

The difference between the area of the smaller circle and the larger circle is 20cm^2

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First lessons

- Introductions
- Hand out books and starter packs
- Establish expectations and routines
- Quick overview of the year ahead
- Maths!

Starting Place 1 (index) - remember your book

Welcome to Maths

with Mrs Morgan

Three Aims

- Enjoy your maths lessons
- Increase your understanding and develop strong reasoning skills
- Master hard + old knowledge practice for yourself for your own effort

KNOW THE RULES!

1. Always write down what you're doing, so you can go back and check later
2. Always write down what you're doing
3. Always write down what you're doing
4. Always write down what you're doing
5. Always write down what you're doing
6. Always write down what you're doing
7. Always write down what you're doing
8. Always write down what you're doing
9. Always write down what you're doing
10. Always write down what you're doing

Index

Index

Index

Index

Books

- Use the four main books
- Use a margin in pencil
- Use the top for a note
- Use the bottom for a note
- Use the side for a note
- Use the back for a note



Index

Index

Monday	Index notation
Tuesday	The multiplication law
Wednesday	The power law
Thursday	Change of base
Friday	The division law
Saturday	Zero index plus mixed practice
Sunday	Problem solving using indices + quiz

Index

Base

24

The 'powers of 2'

$$2^1 = 2$$

$$2^2 = 2 \times 2$$

$$2^3 = 2 \times 2 \times 2$$

$$2^4 = 2 \times 2 \times 2 \times 2$$

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2$$

$$2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

Index

Base

24

This is the fourth power of 2

We say -
"Two to the power of four"
or "two to the fourth"

The 'powers of a'

$$a^1 = a$$

$$a^2 = a \times a$$

$$a^3 = a \times a \times a$$

$$a^4 = a \times a \times a \times a$$

$$a^5 = a \times a \times a \times a \times a$$

$$a^6 = a \times a \times a \times a \times a \times a$$

Index

Base

a4



Listen, focus,
ask questions



Mini-
whiteboard:
try and check



Make notes
or complete
tasks in your
book

Seating Plans

"Miss, can I sit next to my friend? I'll work better"



➡ Ask last year's teacher ◀

Consider tutor group, gender (seat boy/girl), behaviour, attainment

Read this: <https://www.sec-ed.co.uk/best-practice/nqt-special-edition-get-your-seating-plans-right/>

Watch this: <https://www.tes.com/teaching-resource/seating-plans-6344141>

Desirable Routines

- ✓ When you arrive they have their equipment and books out and they are all working. They know exactly what to do and where to do it.
- ✓ Students indicate when they need support during the lesson, and an appropriate process is in place for this.
- ✓ If you need any materials handed out (and you're allowed to do so), it's highly efficient and ensures minimal movement around the room.





If you want this, you need to explicitly teach it and practise it

Watch: <https://teachlikeachampion.com/blog/eric-snider-installs-turn-talk-routine/>

Support

- ✓ Sit students who are likely to need to most teacher support in the front row – these may be the only students you can help directly. Change seating plans when required.
- ✓ Consider seating confident 'strong' students next to students who they might be able to support.
- ✓ Use mini-whiteboards or a visualiser to view workings and give feedback.
- ✓ Consider lesson structures: keep the class together, teach in small chunks, reduce any long periods of independent work.

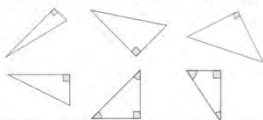
How to use a visualiser: <https://www.youtube.com/watch?v=6Jdrx-cv35k>

Filling Lockdown Gaps

Evaluate $(11 - 3 \times 2)^2$

The ratio 400g: 1kg can be written in the form 1:n. Find the value of n.

Label the hypotenuse with the letter 'h' in each of these right-angled triangles.

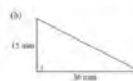


A square number and a prime number have a total of 22. What are the numbers?

Find the median: 1, 11, 17, 20.

Expand and simplify $(x+7)(x-2)$

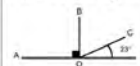
Calculate the length of the hypotenuse in each of these triangles. You may use a calculator.



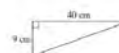
Find two square numbers that total 45.

There are 120 males and 180 females in Albany Tennis Club. Write the number of males to the number of females as a ratio in its simplest form.

Calculate the acute angle BOC.




Calculate the length of the hypotenuse in each of these triangles. You may use a calculator.





Write all the factors of 30 which are also factors of 20.

Write down the mathematical name for this shape.



Solve $\frac{12}{4} \div 3$


Calculate the length of the hypotenuse in each of these triangles, giving your answer to one decimal place. You may use a calculator.

(i)  (ii) 



Write all the common multiples of 3 and 8 that are less than 50

Simplify $x^3 + x^3$

Find the area of this shape.




Calculate the length of the side marked x in each of these triangles. You may use a calculator.

(i)  (ii) 

Write two decimals, each less than 1, which multiply to make 0.1


By using each number connect to 1 significant figure, find an estimate for this calculation: $\frac{22.1 \times 37}{1.9}$

Here is a triangle drawn inside a square. Work out the size of angle x .



Use a calculator.

The diagram shows part of the framework of a roof.

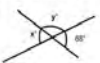


(i) Calculate the length WZ .
(ii) Calculate the length WYZ , correct to 1 decimal place.



Write 840 as a product of its prime factors.

Write 45% as a fraction in its simplest form.

Calculate the size of angles x and y .




Which of the rectangles below has the longer diagonal?

Rectangle A:  Rectangle B: 



Write all the numbers between 50 and 100 that are factors of 180

Write down the next term in this sequence: 3 6 12 24 48

Here is an equilateral triangle. Find the value of x .




Calculate the length of the side marked x in each of these triangles. You may use a calculator. Give your answers to one decimal place.

(i)  (ii) 



Find the multiple of 48 that is closest to 8000

Estimate the answer to 29.2×4.17 .

Write a simplified algebraic expression for the area of this rectangle.



Calculate the length of the side marked x in each of these triangles. You may use a calculator.


(i)  (ii) 

List the common factors of 24 and 32.

Write $\frac{8}{15}$ as a percentage.

These numbers have a mean of 12: 4, 15, x . Find the value of x .

A ladder of length 8 m leans against a wall so the top of the ladder is 6 m above the ground. How far is the bottom of the ladder from the wall?



Write the three prime numbers which multiply to make 231.

We will use starters to re-teach our 'lockdown' topics

Stretch

- ✓ For all classes, including any 'mixed attainment' classes, always have extension work ready.
- ✓ Extension work should provide challenge through greater depth, not 'more of the same' and not 'acceleration onto the next topic'.
- ✓ Great sources of extension material shown on the next few slides...

MathsPad

(subscription required)

Mystery Grids and other puzzle-based resources

Use the clues to complete the grid at the bottom

the numbers in the middle row all have a factor in common, other than 1

the number in the top right is a cube number

the middle number has an odd number of factors.

the number in the top left is a prime factor of the number in the bottom left

2

the numbers in the right hand

all the numbers in the grid are greater than 10 and less than 30

the number above 25 is a prime number whose digits are the same

j)

	6	
--	---	--

is a multiple of 3 less than 200

k)

	4	
--	---	--

is the largest possible multiple of 6

l)

	1	
--	---	--

is the smallest multiple of 6 possible

m)

	4	
--	---	--

is the largest possible multiple of 15

n)

3		
---	--	--

the largest number that is not a multiple of 2, 3 or 5

o)

	1	
--	---	--

the smallest number that is not a multiple of 3, 4 or 5

Median Don Steward

(free)

Fluency tasks
combined with
rich thinking
tasks

expand the brackets and then simplify the expressions

$$1) \quad 5(b + 5) + 7(b + 2) + 2(b + 1)$$

six expressions:

$$2(9b - 13a)$$

$$3(2b - 11a)$$

$$4(3a - 5b)$$

$$5(2a - 3b)$$

$$6(3a - b)$$

$$7(3a + 2b)$$

(1) which two sum to $4(3b - 2a)$?

(2) which two add to $7(4a - 3b)$

(3) which three sum to zero?

(4) which three sum to $4(a - 2b)$?

Median Don Steward

(free)

Fluency tasks
combined with
rich thinking
tasks

practice makes perfect: fraction division

(show your steps)

1)

$$\frac{3}{8} \div \frac{1}{4}$$

2)

$$\frac{9}{10} \div \frac{3}{5}$$

3)

$$\frac{4}{5} \div \frac{6}{5}$$

4)

$$\frac{3}{4} \div \frac{9}{8}$$

5)

$$\frac{5}{2} \div \frac{8}{3}$$

6)

$$\frac{5}{6} \div \frac{8}{9}$$

7)

$$\frac{4}{5} \div \frac{6}{5}$$

8)

$$\frac{5}{8} \div \frac{15}{16}$$

9)

$$\frac{4}{5} \div \frac{9}{10}$$

10)

$$\frac{5}{6} \div \frac{15}{16}$$

11)

$$\frac{12}{13} \div \frac{25}{26}$$

12)

$$\frac{12}{13} \div \frac{51}{52}$$

13)

what are the missing fractions?

$$\frac{1}{2} \div \frac{\square}{\square} = \frac{4}{5}$$

$$\frac{2}{3} \div \frac{\square}{\square} = \frac{4}{5}$$

$$\frac{3}{5} \div \frac{\square}{\square} = \frac{4}{5}$$

$$\frac{8}{9} \div \frac{\square}{\square} = \frac{4}{5}$$

14)

work out

$$\frac{3}{4} \div \frac{15}{16} =$$

$$\frac{3}{4} \div \frac{9}{10} =$$

$$\frac{3}{4} \div \frac{7}{8} =$$

find similar results
for $\frac{4}{5} \div \frac{\square}{\square}$

15)

using 2, 3, 4 and 5 (once only)
how do you make the given fraction?

$$\frac{\square}{\square} \div \frac{\square}{\square} = \frac{15}{8} \quad \text{two solutions}$$

$$\frac{\square}{\square} \div \frac{\square}{\square} = \frac{10}{3} \quad \text{two solutions}$$

$$\frac{\square}{\square} \div \frac{\square}{\square} = \frac{5}{6} \quad \text{two solutions}$$

Open Middle

(free)

Rich tasks that
require
understanding and
deeper thinking

ADDING FRACTIONS TO MAKE A WHOLE NUMBER

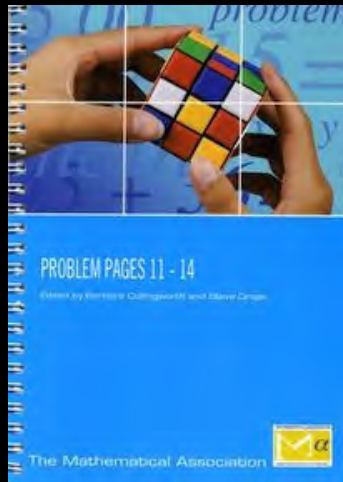
Directions: Using the digits 1-9, fill in the blanks to make a whole number sum. Use each digit only at most one time. Can you make all whole numbers from 1 to 9?

$$\frac{\square}{\square} + \frac{\square}{\square} = \square$$

Problem Pages

(to purchase from the MA's website for £5 each)

Always ready to use
– helpful for when you have one or two students in the class who always need extension work



Check
resourceaholic.com
resource libraries
for free resources,
including many
suitable for
extension work.

Continued Fractions

The expression at the right is an example of a *continued fraction*. The example shows how to change an improper fraction into a continued fraction.

$$1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{9}}}$$

Example Write $\frac{72}{17}$ as a continued fraction.

$$\begin{aligned}\frac{72}{17} &= 4 + \frac{4}{17} \\ &= 4 + \frac{1}{\frac{17}{4}} \\ &= 4 + \frac{1}{4 + \frac{1}{4}}\end{aligned}$$

Notice that each fraction must have a numerator of 1 before the process is complete.

Exercises

Change each improper fraction to a continued fraction.

1. $\frac{13}{10}$

2. $\frac{17}{11}$

3. $\frac{25}{13}$

4. $\frac{17}{6}$

Write each continued fraction as an improper fraction.

5. $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2}}}$

6. $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{3}}}$

7. $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{5}}}$

Other ideas
include UKMT
Problems,
NRich etc

<https://drive.google.com/file/d/0B9L2lYGRiK2bVzZBUVBBDnJaMkU/view>

'Normality'

**What should we think about when
planning to teach a topic?**

Curriculum

Assessment

Examples and explanation

Methods

Vocabulary

Tasks and resources

Misconceptions

Enrichment and narrative

This is what should be in your department meetings

Tom Dolan created a 'topic think through' planning tool to help maths teachers think through a topic or series of lessons before they plan in more detail.

Topic:

<p>Key prior knowledge</p> <p><small>What should they know already?</small></p>	<p>Pupils should know / be able to...</p> <p><small>What should they learn here?</small></p>	<p>Links to other topics</p> <p><small>Where will this be useful?</small></p>
<p>Important vocabulary</p>	<p>Questions to ask</p> <p><small>Skills / knowledge to include in questions</small></p>	<p>Topics to interleave</p>
<p>Key Representations</p>	<p>Common misconceptions</p>	<p>Extension and enrichment</p>
<p>Assessment</p> <p><small>Finding out how well do they understand the topic – what questions to ask and how</small></p>		<p>Topic Think Through</p>

https://beauchampcoll-my.sharepoint.com/:w:/g/personal/tim_dolan_beauchamp_org_uk/EZ9c6bs2lkZCuY91iGwUlnMBaDZVq6kUU6a8g04y6dgubw?rtime=uhgip9lg2Eg

Once you've thought through the topic, you can plan out a rough timeline for the sequence of lessons.

Be flexible and responsive to your students – you will need to adapt as you go.

- | | |
|-----------------------------------------|-------------------------------|
| 1 Recap surds | 8 Method selection: non-RAT |
| 2 Recap right-angled trig | 9 3D Trigonometry |
| 3 Exact values: derive | 10 $\frac{1}{2}ab\sin C$ |
| 4 Calculations with exact values | 11 Trig graphs |
| 5 Right-angled probs (inc exact values) | 12 Exact values & trig graphs |
| 6 Sine Rule | 13 Ambiguous case |
| 7 Cosine Rule | 14 Consolidation + problems |

Monday	Index notation
Tuesday	The multiplication law
Thursday	The power law
Friday	Change of base
Monday	The division law
Tuesday	Zero index plus mixed practice
Thursday	Problem solving using indices
Friday	Quiz and consolidation

https://beauchampcoll-my.sharepoint.com/:w:/g/personal/tim_dolan_beauchamp_org/uk/EZ9c6bs2lkZCuY91iGwUlnMBaDZVq6kUU6a8g04y6dgubw?rttime=uhgjp9lg2Eg

A lesson planning spectrum



1. Download someone else's slides
2. Deliver generic lesson 'blind'

Thought = 1

Time = 1

1. Research the topic in detail
2. Think deeply about how best to teach the topic, drawing on evidence, experience etc
3. Identify the most suitable tasks for your specific students
4. etc

Thought = 10

Time = 10

Making every maths lesson count



*Six principles to support
great maths teaching*

Emma McCrea
Edited by Shaun Allison and Andy Tharby

*Accessible, succinct and easily digestible, Making
Every Maths Lesson Count neatly summarises the
key ideas in maths teaching.*



Jo Morgan, maths teacher and
creator of resourceaholic.com

#MEMLC

Factors in choosing resources...

Does it meet your intended **aims**?

Is it **accessible**, whilst providing **stretch & challenge** ('low floor, high ceiling')?

Practicalities: Is the maths correct? Is the spelling and grammar perfect? Is it print budget friendly? (e.g. A5 black and white). Is it well formatted (clarity, space, font etc) with straightforward instructions? Is cognitive load minimised? (beware clutter).

Are you **looking forward** to using it in class?

Aims: revision, understanding, fluency, assessment etc

Don Steward



a large bag of flour weighs 24kg
it costs £21.50

a sponge cake uses
150g of this flour

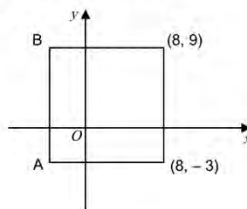


what are the questions that these calculations find c

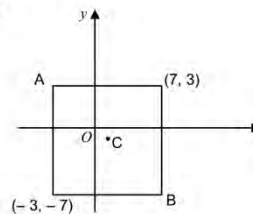
- (a) $\frac{24000}{150}$ (b) $\frac{24}{21.50}$ (c) $\frac{2150}{24}$ (d) $\frac{21.50}{24000}$

squares and coordinates (ii)

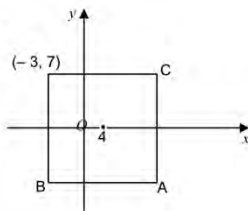
(1)



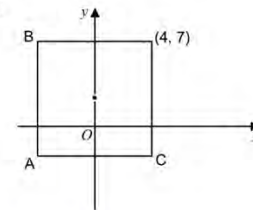
(2)



(3)



(4)



$2 \times 3 \times 13$
is a multiple

$3 \times 15 \times 23$
is a multiple

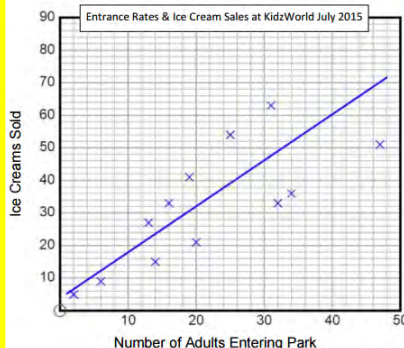
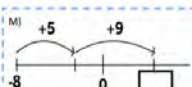
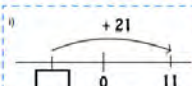
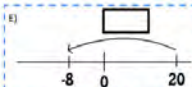
$2^2 \times 15$
is a multiple

2^{10} is a
multiple of 10

16×30
is a multiple

NUMBER LINE JOURNERS

Determine the missing numbers to complete these number line journeys:



scatter graphs: true or false?

A. From the graph we can use extrapolation to determine the number of ice creams that would be sold when 25 adults enter the park.

B. From these data we can use interpolation to predict that if 10 adults entered the park, 5 ice creams would be sold.

C. From the graph we can reliably extrapolate the number of ice creams sold when 100 adults enter the park.

D. We can extrapolate from this data that 50 adults entering the park would lead to 74 ice cream sales.

E. To sell 60 ice creams, we can use interpolation to estimate that 40 adults would need to enter the park.

F. The line of best fit is drawn incorrectly because there are more points below it than above it.

G. The graph shows strong positive correlation.

H. The line of best fit is drawn incorrectly because it should begin at (0,0).

ISOSCELES TRIANGLES FROM TWO RADII

<p>A1 Find the shaded angle</p>	<p>A2 Find the shaded angle</p>
<p>B1 Find the shaded angle</p>	<p>B2 Find the shaded angle</p>
<p>C1 Find the shaded angle</p>	<p>C2 Find the shaded angle</p>

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REVIEW

AREA OF A TRIANGLE

EXAM-TYPE QUESTIONS

Ref: G456 2R1

<p>A1 Find the area of triangle ABC</p>	<p>A2 Find the area of triangle DEF</p>	<p>A3 Find the area of triangle GHI</p>	<p>A4 Find the area of the kite</p>
<p>B1 Find the area of triangle JKL</p>	<p>B2 Find the area of triangle MNO</p>	<p>B3 Find the area of triangle PQR</p>	<p>B4 Find the area of the shape</p>
<p>C1 The area of the triangle is 16.5 cm^2.</p> <p>The angle x° is acute. Find the value of x.</p>	<p>C2 The area of the triangle is 20 cm^2.</p> <p>The angle x° is obtuse. Find the value of x.</p>	<p>C3 ABC is a triangle. $AB = 11 \text{ cm}$ $AC = 7 \text{ cm}$</p> <p>The area of triangle ABC is 32 cm^2. Find, in degrees, the two possible sizes of angle BAC.</p>	<p>C4 Find the shaded area</p>

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Worksheets, Videos, Interactive Quizzes and Exam Solutions

Alpha Exercise 1

Find the area of each sector.

Can you see how the answer to each question is related to the previous one?
Give your answers (i) to 3 significant figures and (ii) in terms of π .




i)  ii)  iii) 

Diagram not drawn accurately

Alpha Exercise 2

Find the area of each sector.

Can you see how the answer to each question is related to the previous one?
Give your answers (i) to 3 significant figures and (ii) in terms of π .


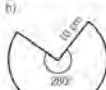

i)  ii)  iii) 

Diagram not drawn accurately

Gamma Exercise

Each diagram shows a sector of a circle with a segment shaded. Find the area and perimeter of each shaded segment. Write your answer correct to 3 significant figures.

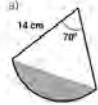



i)  ii)  iii) 

Diagram not drawn accurately

Explain the mistake

Celia finds the area of the shaded segment as follows:

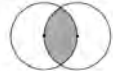


Area of circle = $\pi \times 6^2 = 36\pi$
 Area of sector = $\frac{120}{360} \times 36\pi = 12\pi$
 Area of unshaded triangle = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 6 \times 6 = 18$
 Area of shaded segment = $12\pi - 18 = 6\pi$

Celia has made two mistakes. What are they?

Challenge

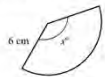
Here are two identical overlapping circles with radius 1. The circumference of each circle passes through the centre of the other.



Show that the shaded area is equal to $\frac{8\pi - 3\sqrt{3}}{6}$.

Exam-style question 1

The diagram shows a sector of a circle.

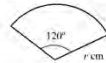


The area of the sector is $14\pi \text{ cm}^2$. Find the angle x .

Diagram not accurately drawn

Exam-style question 2

The diagram shows a sector of a circle.




The length of the arc is 6 π cm.

a) Find the length r .
 b) Hence find the area of the sector. Give your answer in terms of π .

Diagram not accurately drawn

Exam-style question 3

The diagram shows a sector of a circle.



a) Find the area of the shaded segment, rounding your answer to 3 significant figures.
 b) Find the perimeter of the shaded segment, rounding your answer to 3 significant figures.

Diagram not accurately drawn

$$7^3 \times 7^2$$

Yes / No

$$7^3 + 7^2$$

Yes / No

$$7^3 + 6^2$$

Yes / No

$$7^3 \times 6^2$$

Yes / No

$$6^3 \times 6^2$$

Yes / No

$$6^{-3} \times 6^{-2}$$

Yes / No

$$6^{-3} \times 6^2$$

Yes / No

$$6^{0.5} \times 6^{2.4}$$

Yes / No

$$a^7 \times a^2$$

Yes / No

$$a^a \times a^2$$

Yes / No

$$a \times a^2$$

Yes / No

$$a^0 \times a^2$$

Yes / No

$$a^7 + a^2$$

Yes

$$a^7(a^2)$$

Yes

$$a^7 \times b^2$$



Yes

$$a^x \times a^y$$

Yes

$$x^a \times y^b$$

Yes

	Sketch	Radius	Angle	Angle 360 (complete)	Circumference of whole circle	Arc length	Area of whole circle	Area of shaded sector
1		6	180°	$\frac{1}{2}$	12π	6π		
2								
3			45°		12π			
4		6		$\frac{3}{4}$				
5		6				2π		



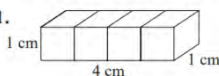
Across	Down
1. Smallest 3-digit cube	1. A palindromic square number
4. $\sqrt{982081}$	2. 24^2
6. 3^6	3. $2 \times 10^3 - 2^1$
7. Largest square number below 200	4. Biggest 3-digit square number
8. First 3 digits of $\sqrt{179\,854\,921}$	5. $(\sqrt{2} \times \sqrt{72})^2$
10. $\sqrt[3]{5\,929\,741}$	9. Last three digits of 2^{14}
12. $2^{10} + 2^7$	10. A power of 2
14. $\sqrt{2.25} \times 16^3$	11. Rearrange the digits of 14^2 to form another square number
15. Answer to 6 across plus 10^2	13. Mean of 1 across and 11 down
17. A palindromic square number	16. A 7 th power
19. A square, and each digit is square	17. $10 \times 8^2 + 3^2$
21. $5^4 + 4^4$	18. 5 squared squared
22. $(\sqrt{905})^2$	19. $\sqrt[3]{72\,511\,713}$
23. 3 squared, cubed	20. 11 down plus $\sqrt{900}$

<https://www.teachitmaths.co.uk/resources/ks3/indices/power-and-roots-crossword/29567>

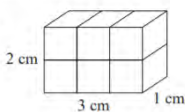
Others eg <https://www.teachitmaths.co.uk/resources/ks3/number/calculator-crossnumber/27986>

What is the volume of each of these solids:

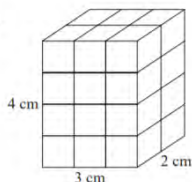
1.



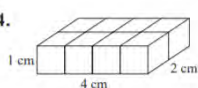
2.



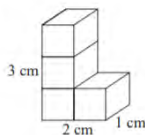
3.



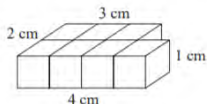
4.



5.



6.



$$1. (6 \times 10^4) \times (2 \times 10^5) = (6 \times 2) \times (10^4 \times 10^5)$$

$$= \quad \times 10^{\quad}$$

$$= \quad \times 10^{\quad}$$

$$2. (8 \times 10^7) \times (3 \times 10^{-2}) = (\quad \times \quad) \times (10^{\quad} \times 10^{\quad})$$

$$= \quad \times 10^{\quad}$$

$$= \quad \times 10^{\quad}$$

$$3. (8 \times 10^{16}) + (2 \times 10^5) = (8 + 2) \times (10^{16} + 10^5)$$

$$= \quad \times 10^{\quad}$$

$$4. (4.2 \times 10^{13}) + (3 \times 10^4) = (\quad + \quad) \times (10^{\quad} + 10^{\quad})$$

$$= \quad \times 10^{\quad}$$

Resourceaholic

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11 May 2019

5 Maths Gems #110

Welcome to my 110th gems post. This is where I share some of the latest news, ideas and resources for maths teachers.

1. TES Author

When we did the latest round of TES Maths Panel reviews, my fellow panelist Damian Watson discovered the wonderful free resources of TES author [cparkinson3](#). This author's PowerPoints are really well designed - they are slick and professional with neatly animated worked examples plus exercises with solutions.



For example check out the two lessons on [volume of prisms](#) - one for Foundation tier and one for Higher tier.

Show two methods of working out the volume of each prism made from 1cm cubes.



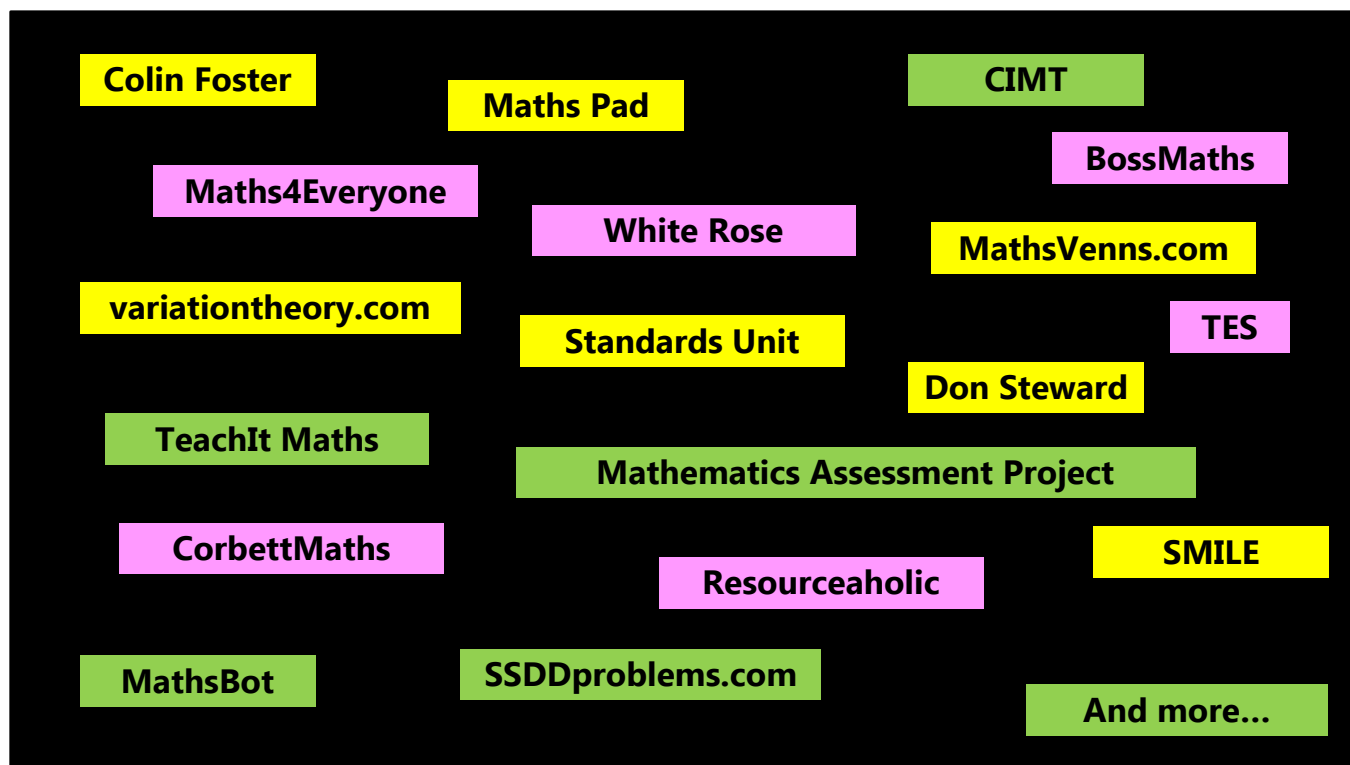
Revision Collection

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Revision
Resources**

Extras

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+ Nrich + lots more etc

Resources Overload

Save it when you see it!

If you have to work out answers, take a photo to save time next year.

Organise your files well (numbered lessons).

Choose a few 'go to' websites.



Must Get Organised

<http://www.symboloo.com/home/mix/mathsresourcewebsites?quickstart=1>



MathsPad

Resourceaholic.com

Don Steward

Boss Maths

CIMT

General advice

- ✓ Pace yourself!
- ✓ Don't be afraid to ask
- ✓ Don't plan too far in advance
- ✓ Priorities: behaviour + explanations
- ✓ Enjoy!

What questions do you have?

What next?

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100 min lessons question:

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