

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?**

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

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

**Where you'll
be teaching?**

**'Nomadic'
teachers**

**Supporting at
a distance**

**What's
different?**

Curriculum?

Groupings

Handouts?





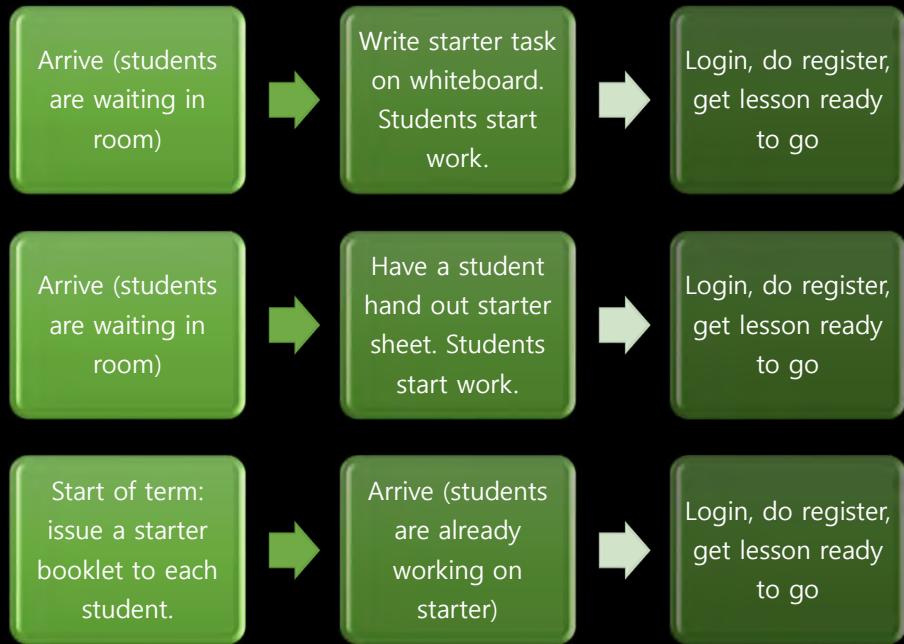




Leave
classrooms
tidy!

**Wipe the
board before
you leave.**

Starting lessons



7 German
Maths Warm Up Booklet
Autumn 1



Name: _____

Warm Up 23 Date: _____

Write the four numbers 10 to make this commutative: $11 \times \boxed{\quad} = 1111$ $8.8 \times \boxed{\quad} = 118.8$

All is a straight line
What is the size of angle A?
This four digit number is a square number
What is the missing shape?

Warm Up 5 Date: _____

Write the three missing digits to make the addition correct: $\begin{array}{r} 7 \ 8 \ 9 \\ + 2 \ \boxed{4} \ 6 \\ \hline 9 \ 1 \ 5 \end{array}$ $\text{Prod } \frac{1}{2} \text{ of } 28$

10kg of cherries cost 45p
Piper buys 250g of cherries
How much does she pay?

List the first six multiples of 15

Warm Up 10 Date: _____

What is the largest whole number to make true: $56 \times \boxed{\quad} = 73$
3 pens cost the same as 2 notebooks.
(One notebook costs £1.00)



What had to be done to multiply? _____
List all the factors of 56.

Warm Up 14 Date: _____

What is the value of 0.00015? $0.00015 \times 1000 =$
The diagram shows a shaded rectangle. If each square is a square, what fraction of the diagram is shaded?

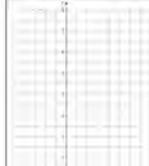


Point B is an isosceles triangle.
Calculate the size of angle x.


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



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

5-a-day		Higher Plus
28th July		
<p>Here are the first 5 terms of a quadratic sequence</p> <p>24 30 38 48 60</p> <p>Find an expression, in terms of n, for the nth term of this quadratic sequence.</p>		
<p>A solid sphere has a diameter of 12cm. The sphere is made from glass. The density of the glass is 2.97g/cm³. Find the mass of the glass sphere.</p>		
Solve		
$x^2 + 9 > 10x$		
<p>A circle has equation $x^2 + y^2 = 100$. Work out the length of the diameter.</p>		
<p>A group of scientists want to estimate the number of eels 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.</p>	<p>Estimate the number of eels in the lake.</p>	
		
29th July		
<p>There are 5 red and 5 green counters in a bag.</p> <p>Kellie takes out a counter, replaces it and takes out another.</p> <p>What is the probability of two reds?</p>		
		<p>On the grid, clearly label the region which satisfies all three inequalities below.</p> <p>$x > 0$ $y \leq 2x$ $x + 2y < 4$</p>
		<p>A is a point on two circles. The smaller circle is inside the larger circle.</p> <p>The radius of the smaller circle is 7cm. The radius of the larger circle is 20cm greater than the radius of the smaller circle.</p> <p>Show that the radius of the smaller circle is $\frac{5}{\pi} - 1$ cm</p>
		<p>The difference between the area of the smaller circle and the larger circle is 200cm².</p>
		

First lessons

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

Handwriting Plan 1 colour handwriting (page 1)

Welcome to Maths
with Mrs Morgan

Three Aims

- Enjoy your maths lessons
- Deepen your understanding and develop strong reasoning skills
- Practice hard = lots of practice for pencil, for pencil when

KNOW THE RULES

1. WRITE down when I'm speaking. Set up straight and write clearly
2. Always draw on handwriting lines
3. Use a pencil and always sharpen
4. Use a ruler to draw straight lines
5. Use a ruler to draw every straight line
6. Start writing letters I write in my handwriting
7. Use a ruler to draw every straight line
8. Use a ruler to draw every straight line
9. Use a ruler to draw every straight line
10. Take pride in your work
11. Always do my best at my handwriting

3 Listen, focus, ask questions
4 Write, draw, make models
5 Make notes or complete tasks in your book

Books

- On the front cover, write 'Handwriting Plan 1' in a pencil
- Find the page for a model
- Always write the title and
- Make sheets in every model

Monday: Index notation

- Wednesday: The multiplication law
- Thursday: The powers law
- Friday: The division law
- Saturday: The division law
- Wednesday: Zero index plus mixed practice
- Friday: Problem solving using indices + quiz

2⁴

Index

Base

The 'powers of 2'

$$\begin{aligned}2^1 &= 2 \\2^2 &= 2 \times 2 \\2^3 &= 2 \times 2 \times 2 \\2^4 &= 2 \times 2 \times 2 \times 2 \\2^5 &= 2 \times 2 \times 2 \times 2 \times 2 \\2^6 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2\end{aligned}$$

Index to remember
2⁴

This is the fourth power of 2.
We say -
'Two to the power of four'

The 'powers of a'
a⁴

$$\begin{aligned}a^1 &= a \\a^2 &= a \times a \\a^3 &= a \times a \times a \\a^4 &= a \times a \times a \times a \\a^5 &= a \times a \times a \times a \times a\end{aligned}$$

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 the 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.

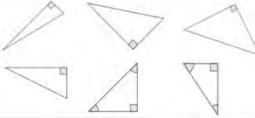
How to use a visualiser: <https://www.youtube.com/watch?v=6Jdrx-cv35k>

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 $(x + 7)(x - 2)$

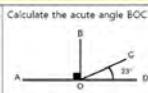
Calculate the length of the hypotenuse in each of these triangles. You may use a calculator.

(a) 

(b) 

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 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.

<p>Write down the mathematical name for this shape.</p> 	<p>Solve $\frac{12}{z} = 3$.</p>
<p>Calculate the length of the hypotenuse in each of these triangles, giving your answer to one decimal place. You may use a calculator.</p> <p>(a)</p>  <p>(b)</p> 	

Write 45% as a fraction in its simplest form	Calculate the size of angles x and y :
	

<p>Estimate the answer to $29.2 \div 417$.</p>	<p>Write a simplified algebraic expression for the area of this rectangle.</p>
<p>Calculate the length of the side marked x in each of these triangles. You may use a calculator.</p> <p>(a)</p>  <p>(b)</p> 	<p>List the common factors of 24 and 32.</p>

Simplify $a^{24} \div a^6$

Find the area of this shape



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

25 cm 13 cm 51 cm

45 cm

white two decimal, each less than 1, which multiply to make 0.3

<p>Write down the next term in this sequence.</p> <p>3 6 12 24 48</p>	<p>Here is an equilateral triangle. Find the value of x.</p>  <p>$x + 6$</p> <p>$3x$</p>
<p>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.</p>	<p>(a) </p> <p>(b) </p>

<p>Write $\frac{8}{15}$ as a percentage</p>	<p>These numbers have a mean of 12. 4, 15, x Find the value of x.</p>
<p>A ladder of length 8m leans against a wall so the top of the ladder is 6m above the ground. How far is the bottom of the ladder from the wall?</p>	<p>Find the perimeter of this triangle</p> 
<p>Write the three prime numbers which multiply to make 231.</p>	

<p>By writing each number correct to 1 significant figure, find an estimate for this calculation.</p> $\frac{22.1 \times 37}{1.9}$	<p>Here is a triangle drawn inside a square. Work out the size of angle x.</p> 
<p>Use a calculator.</p> <p>The diagram shows part of the framework of a roof.</p> <ol style="list-style-type: none"> Calculate the length XZ. Calculate the length of YZ, correct to 1 decimal place. 	

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

2

Use the clues to complete the grid at the bottom

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

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

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

the numbers in the right hand

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

is a multiple of 3 less than 200

is the largest possible multiple of 6

is the smallest multiple of 6 possible

is the largest possible multiple of 15

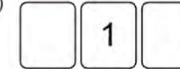
the largest number that is not a multiple of 2, 3 or 5

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

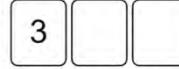
Mathematical Grids

j) 

k) 

l) 

m) 

n) 

o) 

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:

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

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

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

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

$$6(3a - b)$$

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

$$n + 2)$$

$$n + 20)$$

$$8)$$

$$k + 2)$$

$$2)$$

$$1)$$

- (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 $\frac{4}{5} \div \frac{\square}{\square}$
for

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

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

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

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

Open Middle

(free)

Rich tasks that require understanding and deeper thinking

ADDING FRACTIONS TO MAKE A WHOLE NUMBER

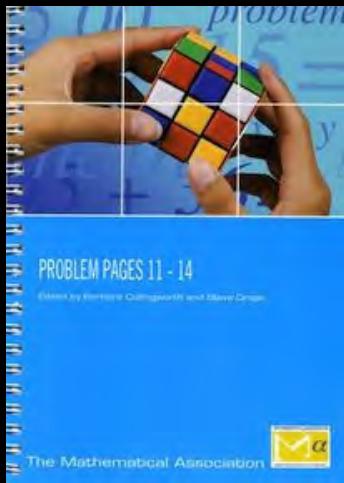
Directions: Using the digits 1-9, fill in the blanks to make a whole number sum. Use each digit only at most one time. Can you make all whole numbers from 1 to 9?

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

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

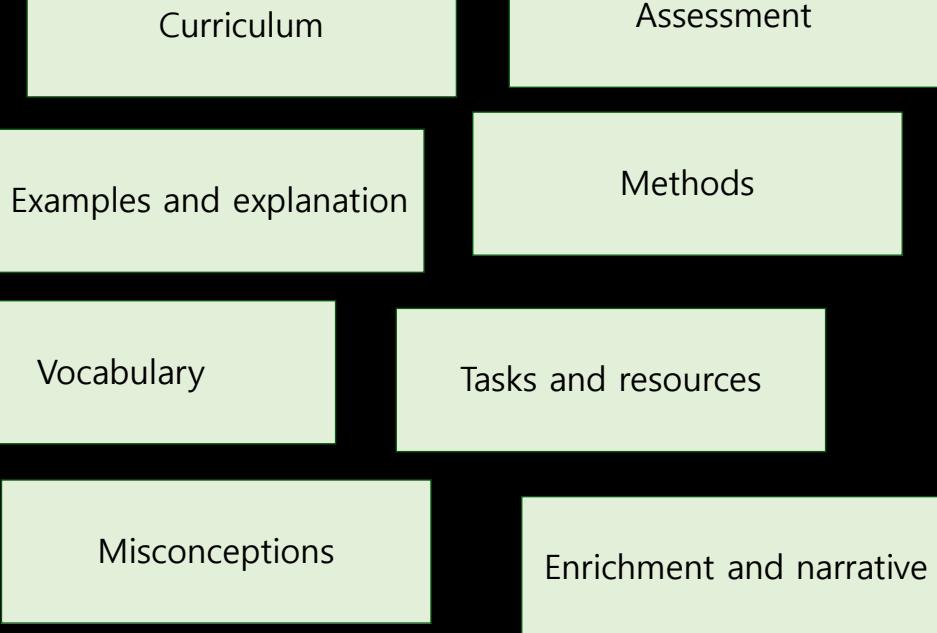
7. $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{5}}}$

Other ideas
include UKMT
Problems,
NRich etc

<https://drive.google.com/file/d/0B9L2lYGRiK2bVzZBUVBBdnJaMkU/view>

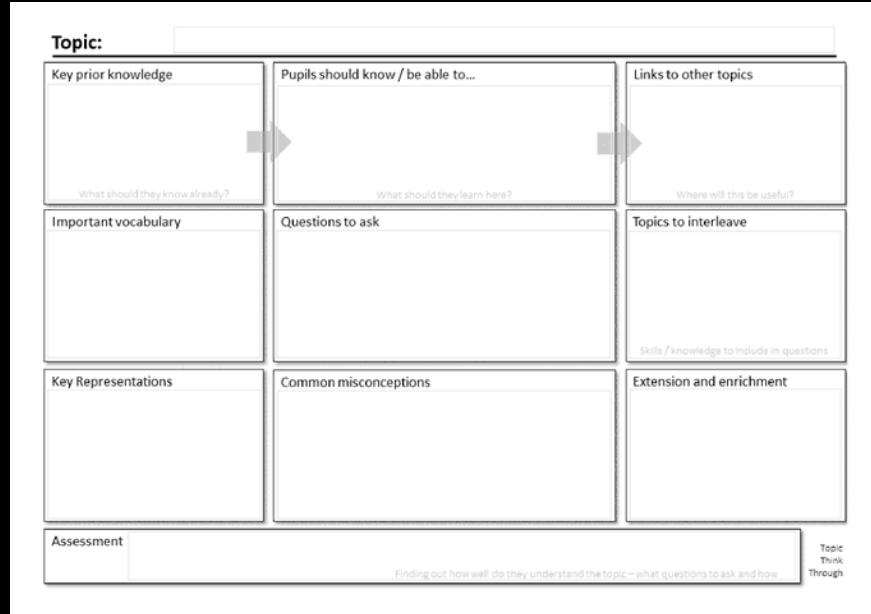
'Normality'

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



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.



https://beauchampcoll-my.sharepoint.com/:w/g/personal/tim_dolan_beauchamp_org_uk/EZ9c6bs2IkZCuY91iGwUlhMBaDZVq6kUU6a8g04y6dgubw?rtime=uhgjp9lg2Eg

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 $\frac{1}{2}absinC$
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/EZ9c6bs2IkZCuY91iGwUlhMBaDZVq6kUU6a8g04y6dgubw?rtime=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



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

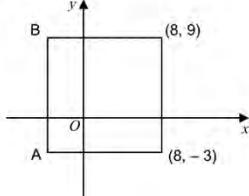
a sponge cake uses
150g of this flour

what are the questions that these calculations find out?

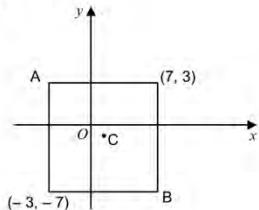
(a) $\frac{24000}{150}$ (b) $\frac{24}{21.50}$ (c) $\frac{2150}{24}$ (d) $\frac{21.50}{24000}$

squares and coordinates (ii)

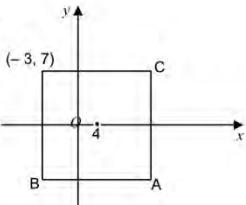
(1)



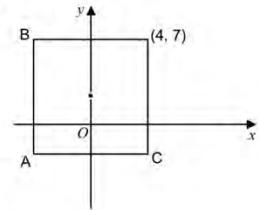
(2)



(3)



(4)



MathsPad

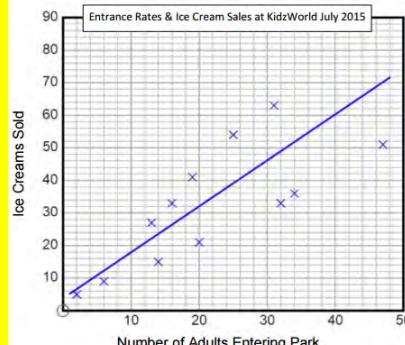
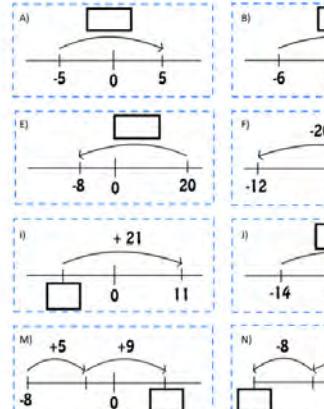
Using prime numbers: true or false?

Tick the cards that are false...

$2 \times 3 \times 13$ is a multiple of 10	$3 \times 15 \times 23$ is a multiple of 10	$2^2 \times 15$ is a multiple of 10	2^{10} is a multiple of 10	16×30 is a multiple of 10
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NUMBER LINE JOURNEYS

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.

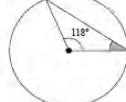
H. The line of best fit is drawn incorrectly because it should begin at (0,0).

FIRST STEPS

ANGLES IN CIRCLES

ISOSCELES TRIANGLES FROM TWO RADII

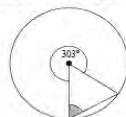
A1 Find the shaded angle



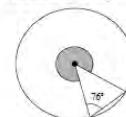
A2 Find the shaded angle



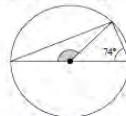
B1 Find the shaded angle



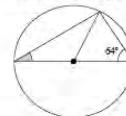
B2 Find the shaded angle



C1 Find the shaded angle



C2 Find the shaded angle



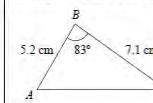
© 2017 Maths4Everyone.com

REVIEW

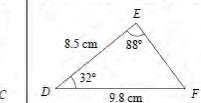
AREA OF A TRIANGLE

EXAM-TYPE QUESTIONS

A1 Find the area of triangle ABC

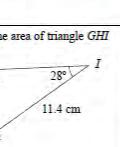


A2 Find the area of triangle DEF

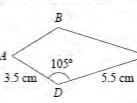


2R1
Ref: G456

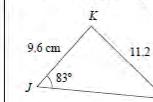
A3 Find the area of triangle GHI



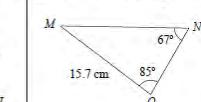
A4 Find the area of the kite



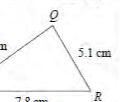
B1 Find the area of triangle JKL



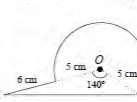
B2 Find the area of triangle MNO



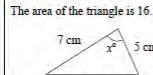
B3 Find the area of triangle PQR



B4 Find the area of the shape

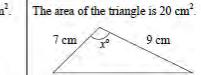


C1 Find the area of triangle KJL



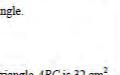
The area of the triangle is 16.5 cm^2 .
The angle x° is acute.
Find the value of x .

C2 Find the area of triangle MNO



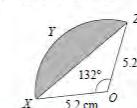
The area of the triangle is 20 cm^2 .
The angle x° is obtuse.
Find the value of x .

C3 Find the area of triangle ABC



ABC is a triangle.
 $AB = 11 \text{ cm}$
 $AC = 7 \text{ cm}$
The area of triangle ABC is 32 cm^2 .
Find, in degrees, the two possible sizes of angle BAC .

C4 Find the shaded area



a

Alpha Exercise 1

Find the area of the 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 .



Diagram not drawn accurately

Alpha Exercise 2

Find the area of the 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 .



Diagram not drawn accurately

Y

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.

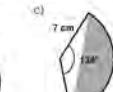
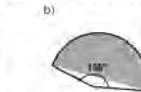
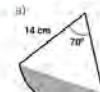


Diagram not drawn accurately

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.



DIAGRAM NOT ACCURATELY DRAWN

The length of the arc is $6\pi \text{ cm}$.

a) Find the length r .

b) Hence find the area of the sector. Give your answer in terms of π .

Exam-style question 3

The diagram shows a sector of a circle.



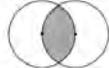
DIAGRAM NOT ACCURATELY DRAWN

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.

Challenge

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



Show that the shaded area is equal to $\frac{4\pi - 3\sqrt{3}}{4}r^2$

$7^7 \times 7^2$

Yes / No

$a^7 \times a^2$

Yes / No

$7^3 + 7^2$

Yes / No

$a^a \times a^2$

Yes / No

$7^3 + 6^2$

Yes / No

$a \times a^2$

Yes / No

$7^3 \times 6^2$

Yes / No

$a^0 \times a^2$

Yes / No

$6^3 \times 6^2$

Yes / No

$a^7 + a^2$

Yes / No

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

Yes / No

$a^7(a^2)$

Yes / No

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

Yes / No

$a^7 \times b^2$

Yes / No

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

Yes / No

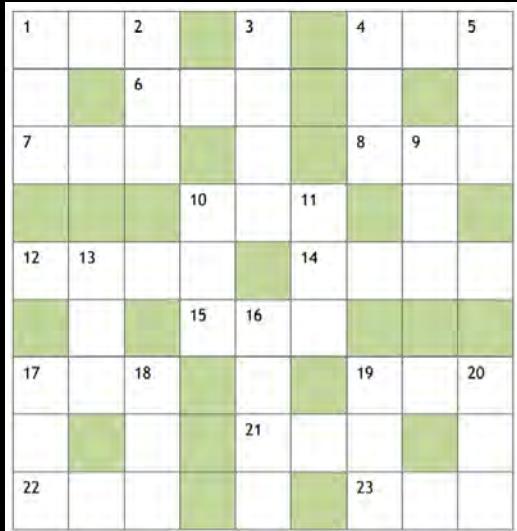
$a^x \times a^y$

Yes / No

$x^a \times y^b$

Yes / No

Sketch	Radius	Angle	Angle $\frac{\pi}{2}$ (in radians)	Circumference of whole circle	Arc length	Area of whole circle	Area of $\frac{1}{4}$ circle
	6	180°	$\frac{1}{2}\pi$	12π	6π	36π	9π
	6	270°	$\frac{3}{4}\pi$	12π	9π	36π	9π
	6	60°					

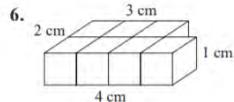
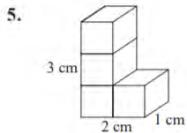
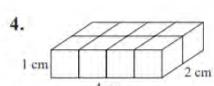
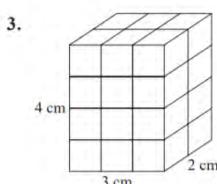
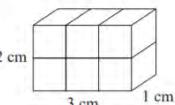
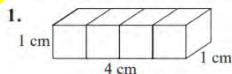


Across	Down
1. Smallest 3-digit cube	1. A palindromic square number
4. $\sqrt{982081}$	2. 24^2
6. 3^6	3. $2 \times 10^3 - 2^1$
7. Largest square number below 200	4. Biggest 3-digit square number
8. First 3 digits of $\sqrt{179\,854\,921}$	5. $(\sqrt{2} \times \sqrt{72})^2$
10. $\sqrt[3]{5\,929\,741}$	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:



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

$$= \times 10 \square$$

$$= \times 10 \square$$

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

$$= \times 10 \square$$

$$= \times 10 \square$$

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

$$= \times 10 \square$$

$$4. (4.2 \times 10^{13}) \div (3 \times 10^4) = (\div) \times (10 \square \div 10 \square)$$

$$= \times 10 \square$$

Resourceaholic

Ideas and resources for teaching secondary school mathematics

Blog

Gems

Algebra

Number

Shape

Data

Year 12 Pure

Year 13 Pure

Statistics

Mechanics

Homework

Blog Archive

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.

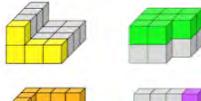
1. TES Author

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

GCSE Revision Resources

Extras

[Blog archive](#)
[Topics in depth project](#)
[Topic posts](#)
[Gems index](#)

[Resources](#)
[Resource library](#)
[More GCSE resources](#)

Colin Foster

Maths Pad

CIMT

Maths4Everyone

White Rose

BossMaths

variationtheory.com

Standards Unit

MathsVenns.com

TeachIt Maths

Mathematics Assessment Project

TES

Don Steward

CorbettMaths

Resourceaholic

SMILE

MathsBot

SSDDproblems.com

And more...

+ 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.

- 1 - Trigonometry
- 2 - Number
- 3 - Percentages
- 4 - Algebra

- 1 - extension
- 1 - starter
- 1 - Inequalities lesson
- 2 - Graphical inequalities
- 2 - practice
- 2 - Starter
- 3 - homework answers
- 3 - Inequalities homework
- 3 - More complex graphical inequalities
- 3 - Starter
- 3 - worksheet



<http://www.symbaloo.com/home/mix/mathsrcewebs?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?

Follow me on Twitter @mathsjem

Buy me a drink! buymeacoffee.com/mathsjem

Join the MA m-a.org.uk

100 min lessons question:

<https://twitter.com/mrsdenyer/status/129762675986998866?s=20> and

<http://taylorda01.blogspot.com/2016/08/after-year-of-one-hundred-minute-lesson.html>