

J Palmer

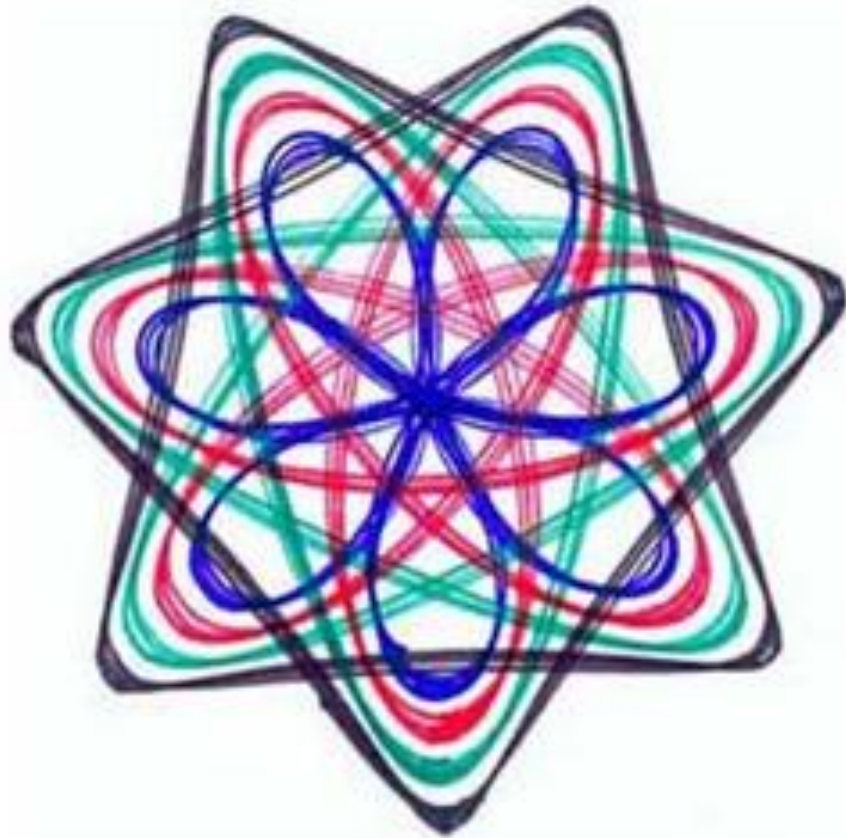
# Key Stage 3 Mathematics

FHSF AGM 2023





Mathematics is the only area of study that is a science, an art and worth studying solely for its own sake.

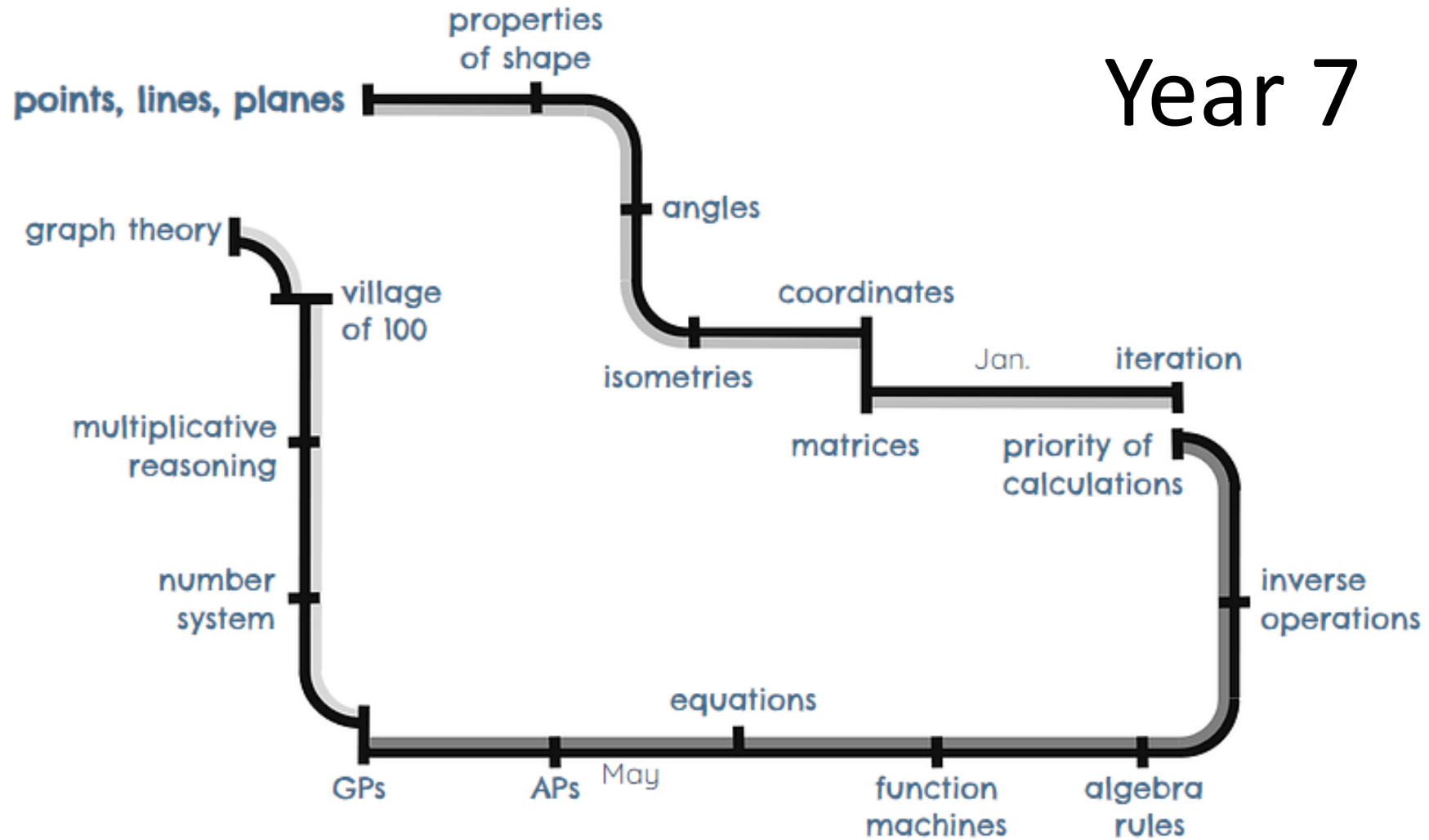


It is the intent of our mathematics curriculum at Farlingaye to firstly highlight the beauty, creativity and interconnections inherent in the subject and thereby enrich the learning experiences of all our students.

Our second intent is for all students, irrespective of background or prior attainment, to be successful in mathematics.

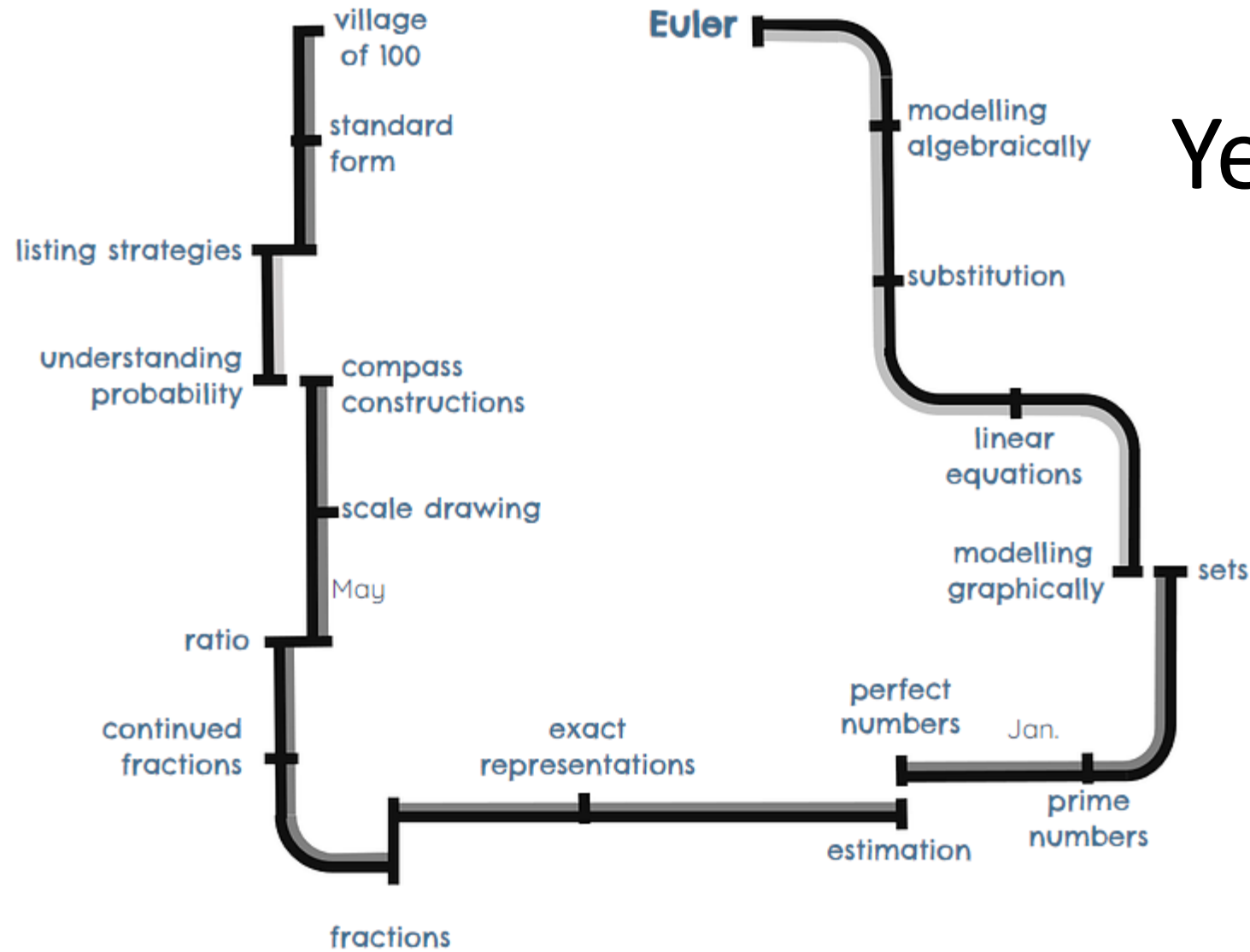


# Year 7



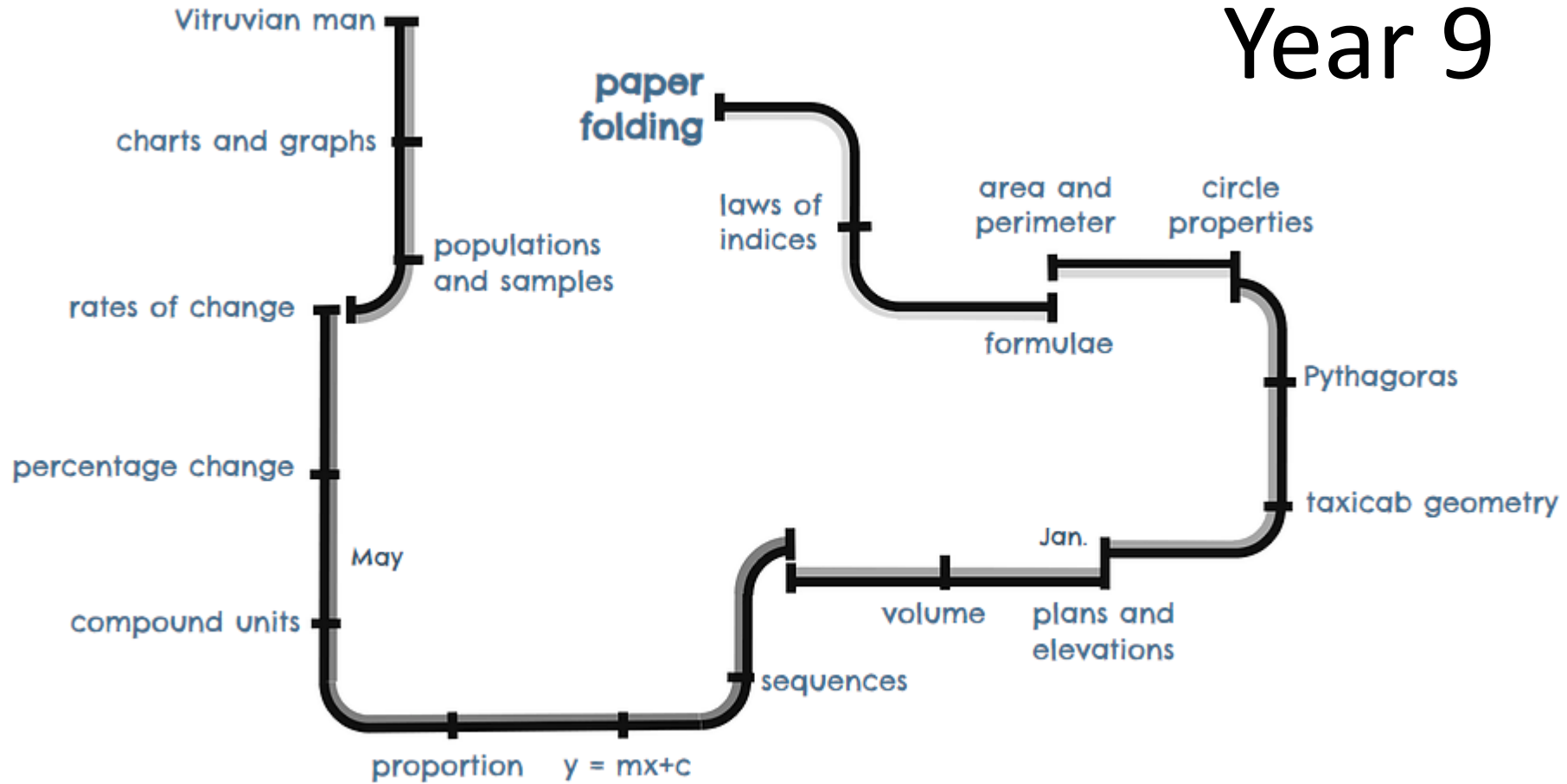


# Year 8





# Year 9





# Lessons at Farlingaye

# ITERATION

What is the game of life?

## Key questions

1. What does it mean to iterate a procedure?
2. What are fractals?
3. Can we use ICT effectively?

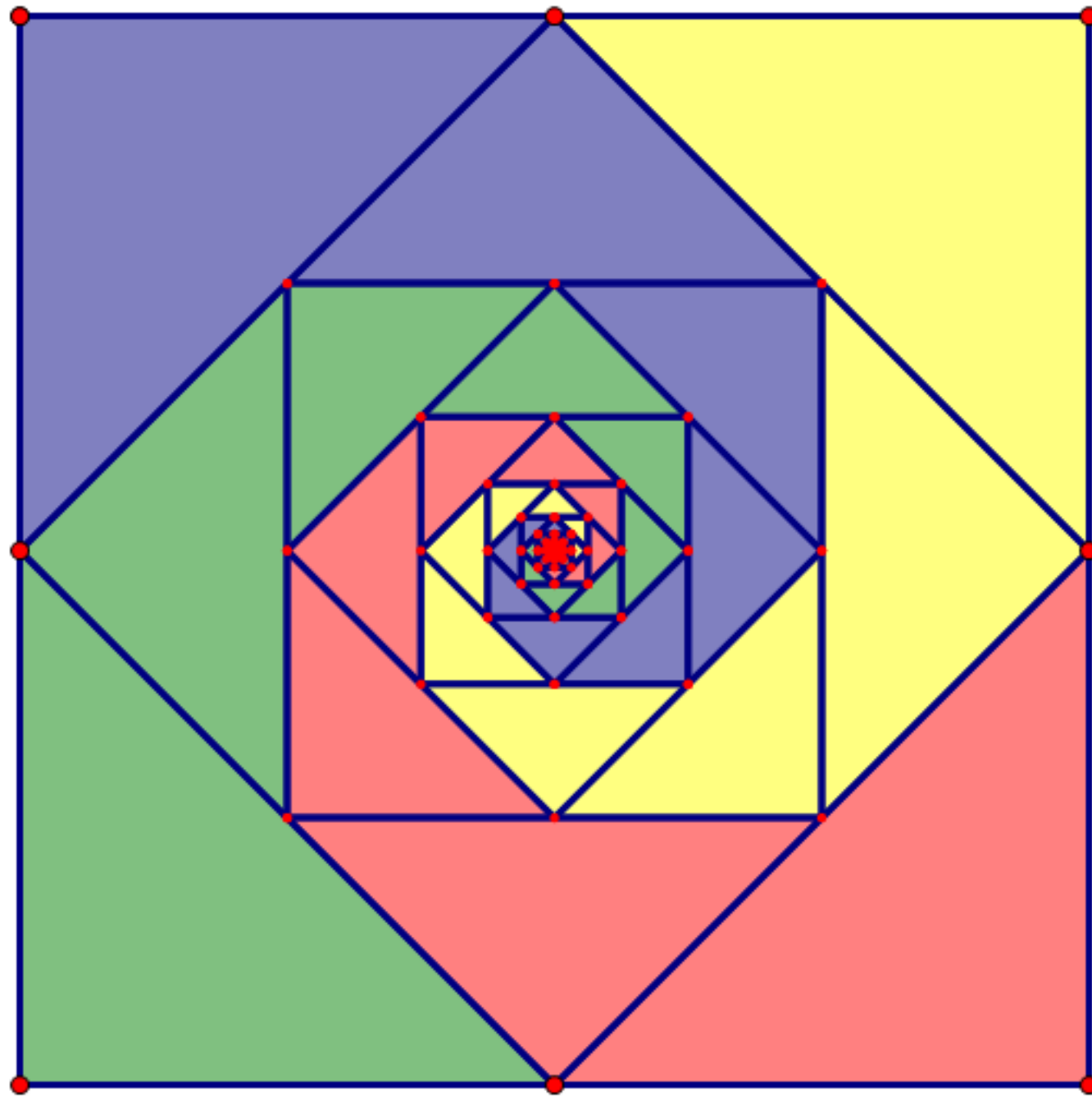
**The Math Inspectors by Kenney and Boever**

~6 lessons

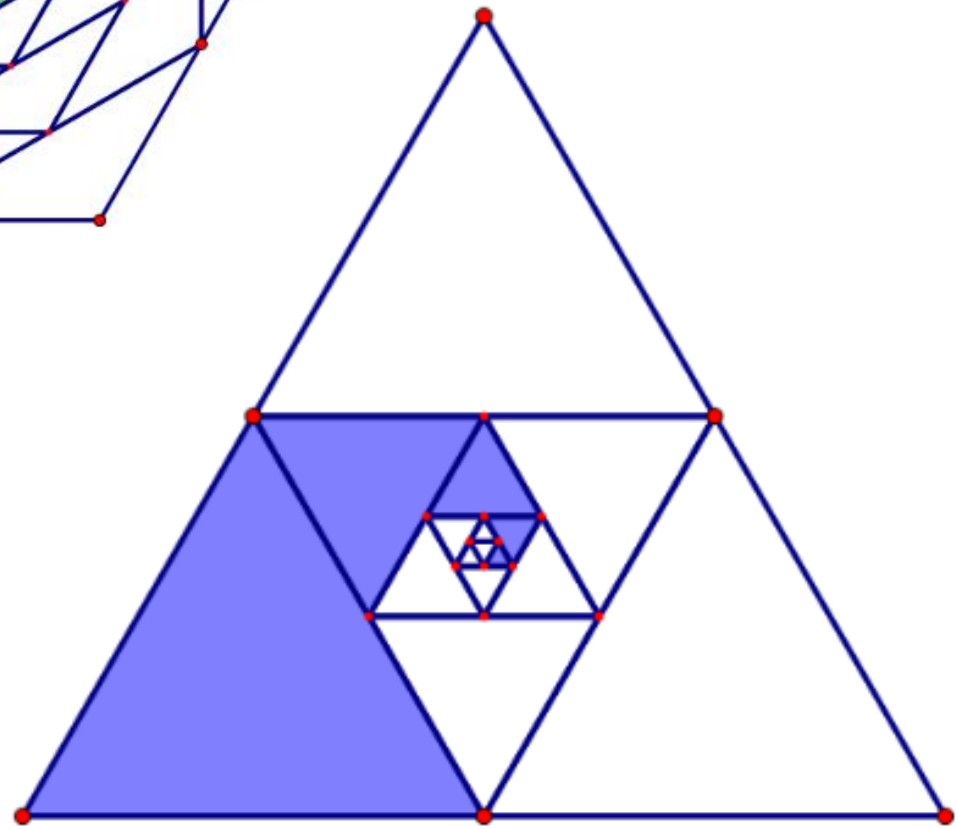
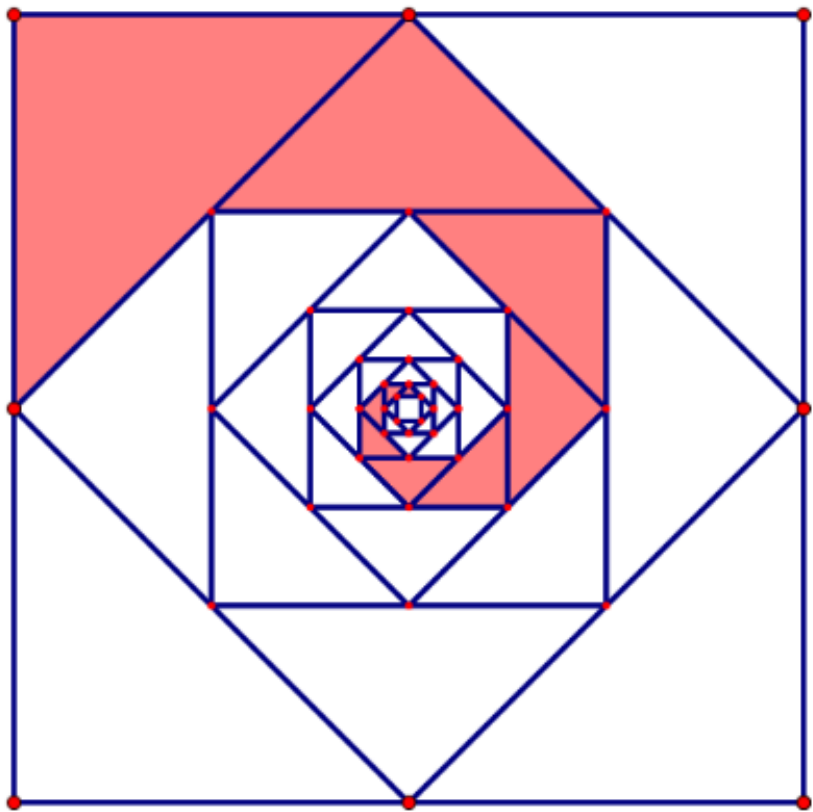
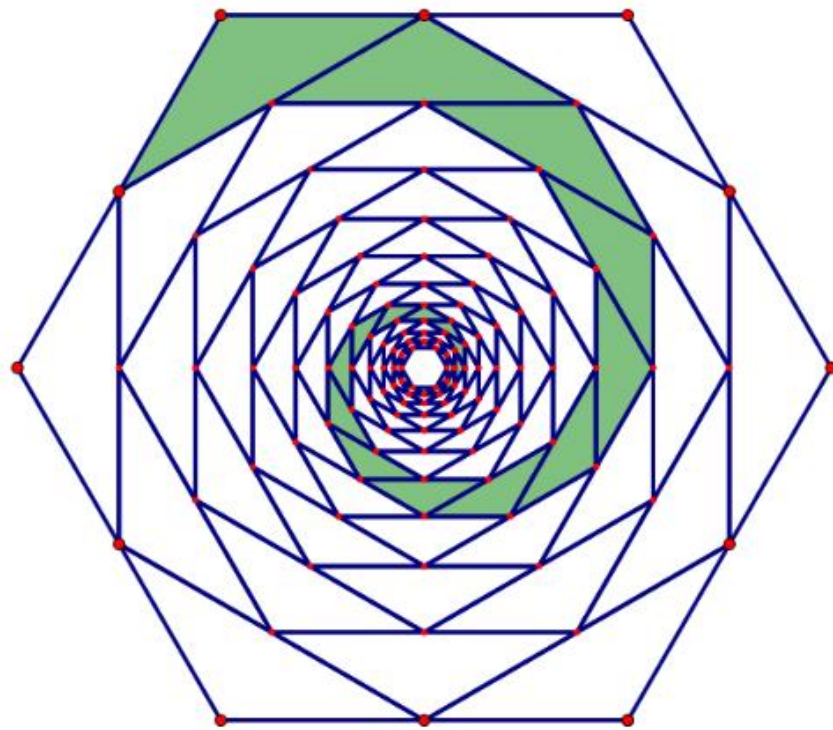


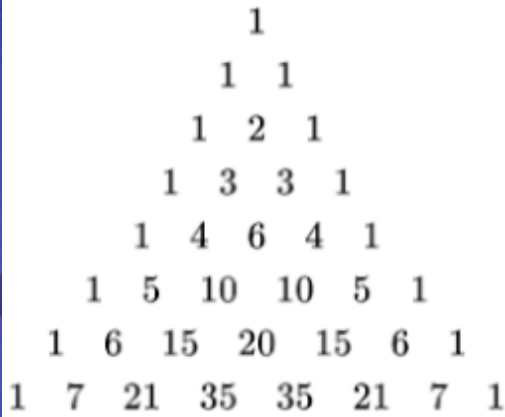
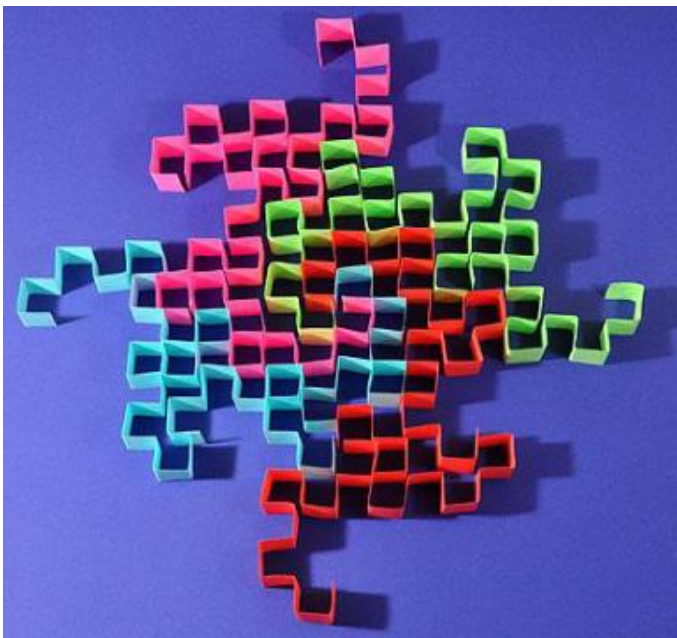
Benoit Mandelbrot (1924 –2010) was a Polish-born French-American mathematician and polymath with broad interests in the practical sciences, especially regarding what he labelled as "the art of roughness" of physical phenomena.





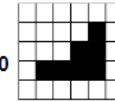




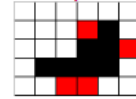


The Rules Illustrated

Generation 0



**Birth:** Any dead cell with exactly three live neighbours becomes alive.



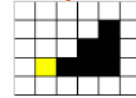
The red cells become alive in the next generation.

**Death by overcrowding:** Any live cell with more than three live neighbours dies.



The orange cells die in the next generation.

**Death by loneliness:** Any live cell with less than two live neighbours dies.



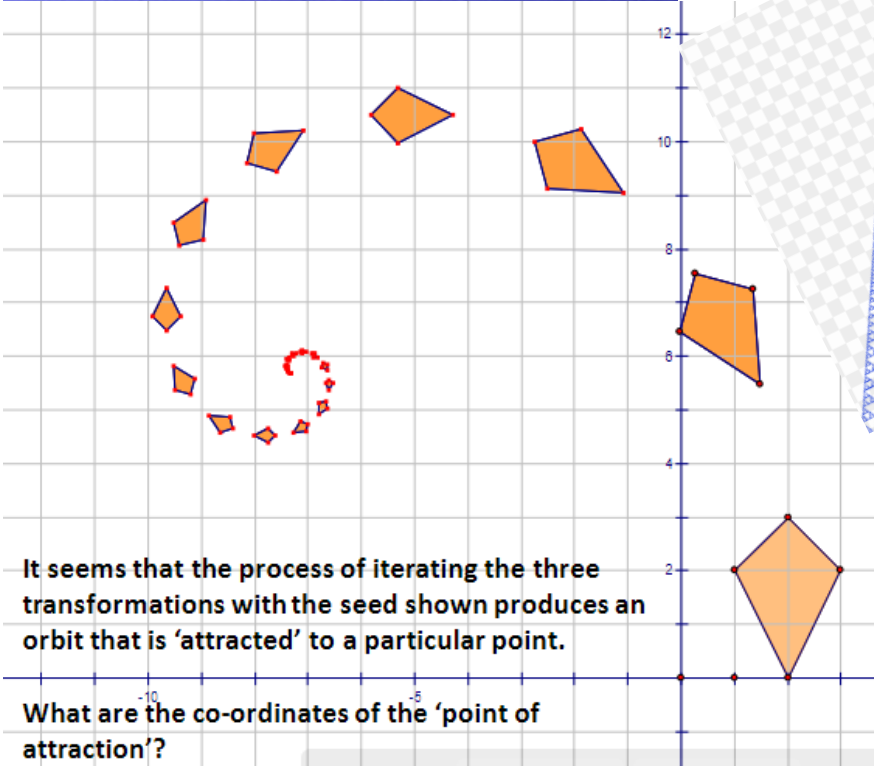
The yellow cell dies in the next generation.

**Survival:** Any live cell with two or three live neighbours lives on.



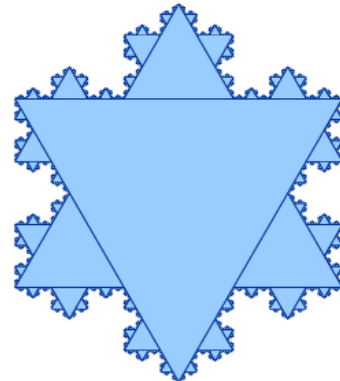
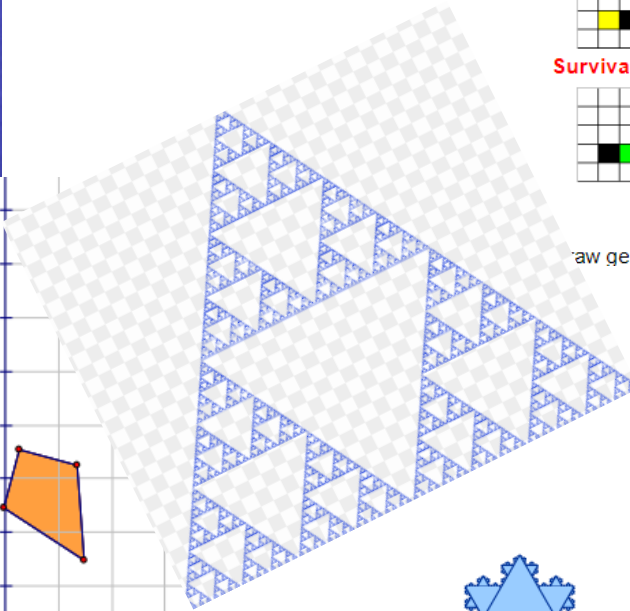
The green cells survive to the next generation.

Law generation 1.



It seems that the process of iterating the three transformations with the seed shown produces an orbit that is 'attracted' to a particular point.

What are the co-ordinates of the 'point of attraction'?



## Happy and Sad Numbers

**Rule:** Take any number, square its digits, and then add them together. Continue with the next number.

**Example 1:**

23	$(2 \times 2) + (3 \times 3) = 4 + 9 = 13$
↓	
13	$(1 \times 1) + (3 \times 3) = 1 + 9 = 10$
↓	
10	...
↓	
...	and so on. 23 is a 'Happy Number'.

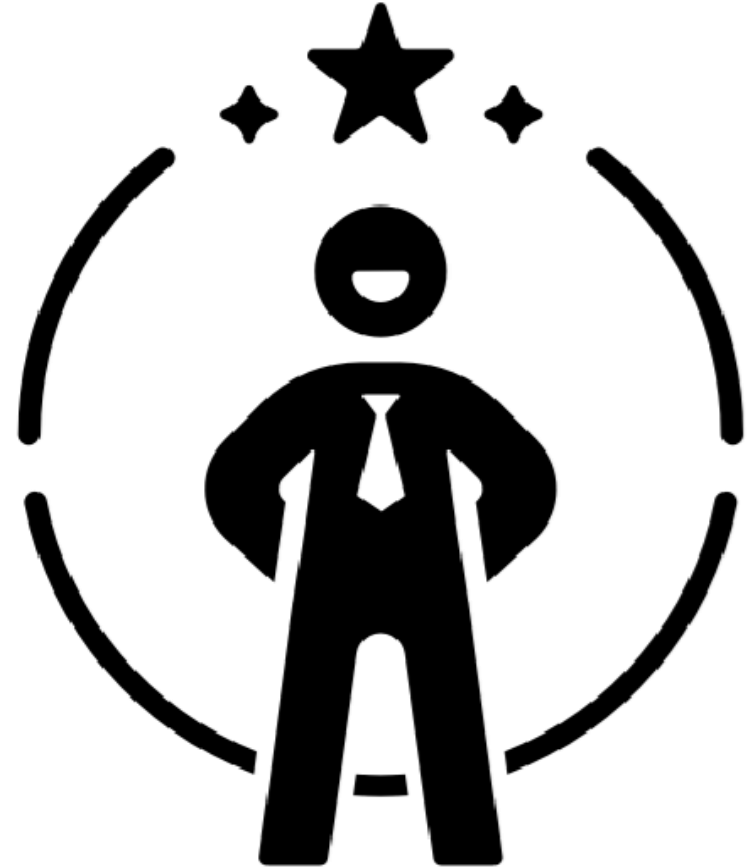




# The importance of literacy



- Literacy supports learning.
- Better literacy leads to improved self-esteem, motivation and behaviour.
- Improved literacy allows students to learn independently and raises attainment.
- Literacy is empowering.



WHY LITERACY?



Reading allows students to see mathematics not as an isolated subject but an integral part of the wider world. Good practice includes:

- comprehension
- **vocabulary**
- enjoyment

The **modelling** of reading skills **by the teacher** is essential.







# Blaise Pascal

Blaise Pascal (1623 –1662) was a French mathematician, physicist, and philosopher. Most of his mathematical contributions were made early in his life, as following a mystical experience in 1654, he fell away from science and devoted himself to theology. Pascal suffered from ill-health throughout his life and died two months after his 39th birthday.

At the age of twelve Pascal discovered that the sum of the angles of a triangle is equal to two right angles. In response to this, his father gave him a copy of Euclid's Elements. At age eighteen Pascal constructed a mechanical calculator which was capable of addition and subtraction.

In 1653 Pascal wrote his *Traité du Triangle Arithmétique* in which he described the "arithmetical triangle", now called Pascal's triangle. In 1654, prompted by a friend's interest in gambling problems, he invented the theory of probability. Pascal later used a probability argument, called *Pascal's Wager*, to justify a belief in God and a virtuous life.

In late 1654 he was involved in an accident at the Neuilly bridge where the horses plunged over the parapet but the carriage survived. Pascal had an intense religious vision and he ceased his work in mathematics in favour of the religious life.

Pascal's last major achievement, returning to his mechanical genius, was inaugurating perhaps the first bus line, moving passengers within Paris in a carriage with many seats. He died in Paris on the morning of August 19, 1662, his last words being "May God never abandon me."

List any words you do not know the meaning of.

Give three facts about Pascal that you found the most interesting.

# Introducin

g

1 Who was Archimedes?  
geometry

2 Where did Archimedes study and who was his teacher?

3 Where was Archimedes born?

4 What were some of the war machines invented by Archimedes?

# ARCHIMEDES

ARCHIMEDES WAS BORN IN  
**287 BC**  
IN THE PORT CITY  
OF SYRACUSE



AS A YOUNG MAN,  
HE WENT TO SCHOOL IN  
ALEXANDRIA, EGYPT.



THERE HE STUDIED UNDER  
THE FAMOUS MATHEMATICIAN  
**EUCLID**

AT THE TIME  
THEY DID NOT EVEN  
HAVE PAPER OR BLACKBOARDS  
AND USED THINGS LIKE  
ASHES OR DUST INSTEAD

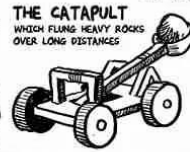


AFTER COMPLETING HIS STUDIES,  
ARCHIMEDES RETURNED TO SYRACUSE  
WHERE HE SPENT THE REST OF HIS LIFE

BECAME GREAT FRIENDS WITH  
**KING HEIRO II** OF SYRACUSE  
WHO USED ARCHIMEDES' TALENTS  
TO HELP DEFEND THE CITY AGAINST  
THE ROMANS

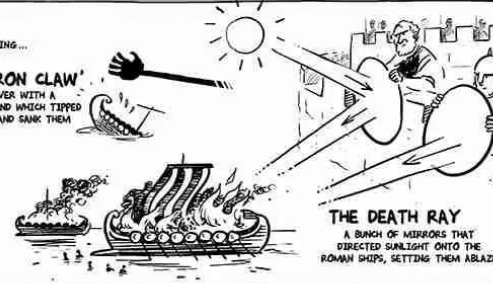


**THE CATAPULT**  
WHICH FLING HEAVY ROCKS  
OVER LONG DISTANCES



ARCHIMEDES USED HIS KNOWLEDGE  
OF MATHS AND SCIENCE TO INVENT  
AN ARRAY OF WAR MACHINES INCLUDING...

**THE 'IRON CLAW'**  
A LONG LEVER WITH A  
CLAW AT THE END WHICH TIPPED  
SHIPS OVER AND SANK THEM



**THE DEATH RAY**  
A BUNCH OF MIRRORS THAT  
DIRECTED SUNLIGHT ONTO THE  
ROMAN SHIPS, SETTING THEM ABLAZE

BESIDES USING HIS SKILLS FOR WAR,  
ARCHIMEDES IS ALSO RESPONSIBLE FOR...

**THE ARCHIMEDES SCREW**

USED TO DRAW WATER  
UPWARDS



WHILE TAKING A BATH, HE NOTICED THAT  
HIS BODY DISPLACED SOME OF THE WATER  
IN HIS BATHTUB CAUSING IT TO OVERFLOW



THIS LED HIM TO HAVE HIS FAMOUS  
BREAKTHROUGH WHERE HE RAN  
THROUGH THE STREETS NAKED  
SHOUTING 'EUREKA!'



THE ARCHIMEDES PRINCIPLE  
IS BASED ON THIS  
BATH-TIME BREAKTHROUGH

HE EVEN PAVED THE WAY  
FOR MODERN CALCULUS  
WHICH IS THE WAY TO  
MEASURE THINGS THAT  
ARE CONSTANTLY CHANGING



**OUR UNDER-  
STANDING OF  
LEVERS**

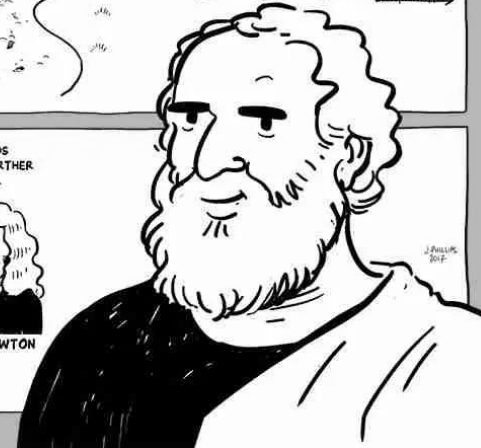
HE ONCE FAMOUSLY SAID  
GIVE ME A PLACE TO STAND  
AND I WILL MOVE THE EARTH



HE DIED IN 212 BC, KILLED BY  
A ROMAN SOLDIER WHO DID NOT  
KNOW WHO HE WAS



ARCHIMEDES INSPIRED GREAT MINDS  
LIKE GALILEO AND NEWTON TO FURTHER  
INVESTIGATE MOTION AND FORCES.

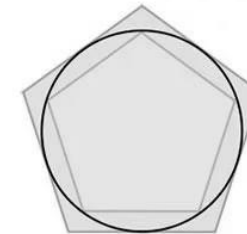


5 What other inventions was Archimedes responsible for?

6 How did Archimedes die?

7 Who was influenced by Archimedes?

8 Archimedes used polygons to understand circles. Which polygon is shown here?





# Introducin

g

## 1 Who was M C Escher? geometry

2 Where and when was Escher born?

3 What did Escher begin his professional life as?

4 Where did Escher visit that inspired him to study tessellations?

# M C Escher



5 How do cosmologists believe the universe is shaped?

6 What is a Mobius strip?

7 When did Escher die?

8 What does Escher's art show mathematics to be?



Benoit B. Mandelbrot is recognized for his contribution to the field of fractal geometry, which included coining the word "fractal", as well as developing a theory of "roughness and self-similarity" in nature,



At the start of his ground-breaking work, *The Fractal Geometry of Nature*, Mandelbrot asks: "Why is geometry often described as cold and dry? One reason lies in its inability to describe the shape of a cloud, a mountain, a coastline or a tree." The approach that he pioneered helps us to describe nature as we actually see it, and so expand our way of thinking.

Your task to produce an A4 poster on the life and work of Mandelbrot.



# Key skills



# Week 1 Session 1



## Mental Strategies Answers

Q	Question	Answer
1	$2 + 3$	
2	$89 + 11$	
3	What is half of 6?	
4	$125 - 10$	
5	$177 + \square = 270$	
6	$53 = 23 + \square$	
7	$805 - 804$	
8	$4 \times 1 = 4$ , so $4 \div 4 = \square$	
9	Write 20:12 in 12 hour clock format	
10	9:37 pm is how many minutes after 9:08 pm?	



# Week 1 Session 1



## Timestables Answers

Q	Question	Answer
1	$2 \times 9 = \square$	
2	$24 \div 3 = \square$	
3	$10 \times \square = 80$	
4	$6 \div \square = 3$	
5	$1 \times 2 = \square$	
6	$28 \div 7 = \square$	
7	$\square \times 6 = 54$	
8	$\square \div 2 = 5$	
9	$3 \times 9 = \square$	
10	$4 \div 4 = \square$	



# Week 1 Session 1



## Key Skills Answers

Q	Question	Answer
1	$61 \times 31$	
2	$657 - 382$	
3	$7.2 \times 94.2$	
4	0.7 as a fraction	
5	$46.15 + 5.08$	
6	$(-40) \div (-4)$	
7	If $a = 4$ , $b = 3$ and $c = 1$ , what is the value of $3a - b^2$ ?	
8	$3 - (-5)$	
9	What is the highest common factor of 12 and 4?	
10	What is the value of 13 squared?	



# SKILLS CHECK

Name :



<b>1</b> Work out $300 + 1 + 0.1 + 0.04 + 0.001$	<b>2</b> Work out $300 + 30 + 0.3 + 0.03 + 0.004$	<b>3</b> Work out $15 \times 64 =$	<b>4</b> Work out $49 \times 40 =$
<b>5</b> Simplify $4x + 4y + 5x + 4y$	<b>6</b> Simplify $2a - 4b + 4a - b$	<b>7</b> $y = \frac{x}{10}$ Find the value of $y$ when $x = 50$	<b>8</b> $y = \frac{x+11}{2}$ Find the value of $y$ when $x = 3$
<b>9</b> Round <b>86</b> correct to 1 significant figure	<b>10</b> Round <b>4393</b> correct to 1 significant figure	<b>11</b> Solve $x - 6 = 4$	<b>12</b> Solve $14 - x = 8$
<b>13</b> Find the missing terms $1, ?, 3, 4, 5, ?$	<b>14</b> Find the missing terms $?, 4, 10, ?, 22, 28$	<b>15</b> Expand $3(6x - 5)$	<b>16</b> Expand $5(5 - x)$
<b>17</b> Complete $13.4 \text{ km} = ? \text{ m}$	<b>18</b> Complete $16.4 \text{ km} = ? \text{ m}$	<b>19</b> What is the <b>8th</b> square number?	<b>20</b> What is the <b>6th</b> cube number?

# Supporting your child in Maths



Using websites such as mymaths, regularly, can keep key skills ticking over and familiarity with the website will help students to use it more effectively for revision, in the future.

These websites may also be used for homework.

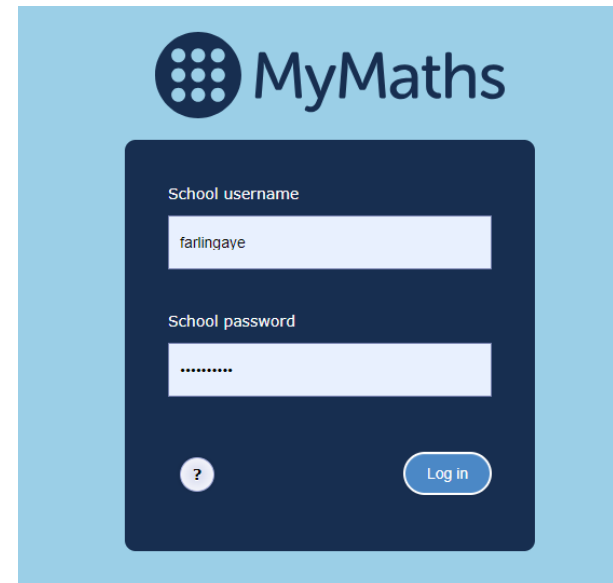
[www.mymaths.co.uk](http://www.mymaths.co.uk)

login: Farlingaye

Password: percentage

[www.mathspad.co.uk](http://www.mathspad.co.uk)

login: personal



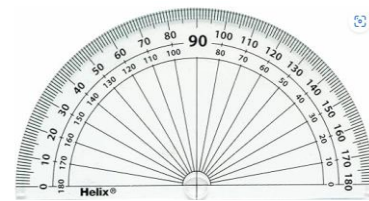




# Supporting your child in Maths

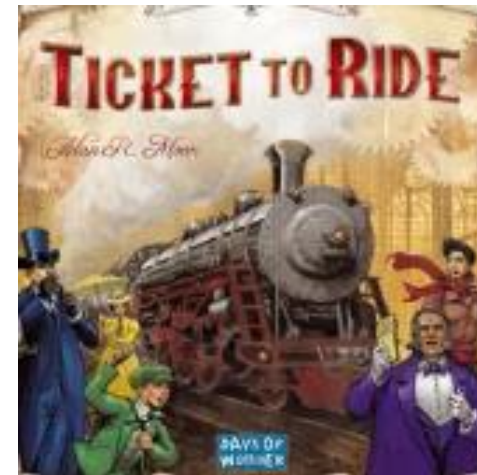
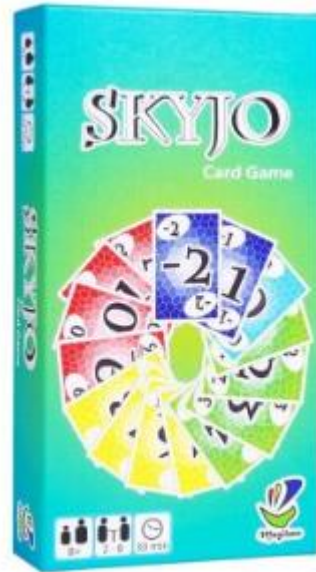
The correct equipment allows your child to get started straight away, being more focused and engaged in the lesson from the very beginning.

2/3 of their final GCSE examination will be with the use of a calculator. Ensuring students can use their calculator effectively is really important



# Supporting your child in Maths

Play games. Many board and card games involve problem solving and logic, and some games will support your child in learning skills such as probability.



# Supporting your child in Maths



Use the Farlingaye maths website.

**If you are absent:**

If you are absent, and well enough to do some maths, you should complete the lessons below. PowerPoints should be downloaded in order to watch the embedded videos.

lesson 1

