

## *~ Right on Time! ~*

Over 200 years ago in England, there lived a man called Abraham de Moivre. Abraham was a very clever man and loved maths. Abraham was very interested in probability, which is the chance of something happening. He spent much of his life trying to find out more and more about probability.

As the years went by, Abraham grew older. One day Abraham noticed that he woke up 15 minutes later than he did the day before.



The next day he noticed he woke up 15 minutes later again. And the day after that he woke up another 15 minutes later. “That’s very strange”, thought Abraham. “Every day I seem to wake up 15 minutes later than the day before”. This continued to happen every morning.

Now Abraham was very clever, and a master of probability. So he thought, “What happens when these extra 15 minutes in bed every morning add up to 24 hours? Will I simply go to bed for two whole days without waking up?” Then he came to a conclusion. “I think when all these 15 minutes add up to 24 hours, this will be the day that I die”.

Abraham used maths to calculate that these 15 minutes extra in bed would add up to 24 hours on the 27th November 1754. And so Abraham waited.

Every morning he continued to wake up 15 minutes later than he woke the previous morning.

Then on the 26th of November, Abraham woke after 23 hours and 45 minutes of extra sleep. He got up, ate, and went back to bed again. This was the last time Abraham would be awake. He died on the exact day that he calculated he would - on the 27th of November 1754. What a genius!





## *~ Apples, Pins and Newton ~*

Many years ago in England, there lived a boy called Isaac Newton. Isaac was not like the other boys in his area. He loved maths and when the other boys were out playing football, Isaac was inside making models of windmills.

Isaac's parents wanted him to become a farmer but Isaac hated physical work. He begged his mother to be left stay in school to study maths. After a while, his mother gave into his demands and allowed him to continue studying, rather than working on the farm.

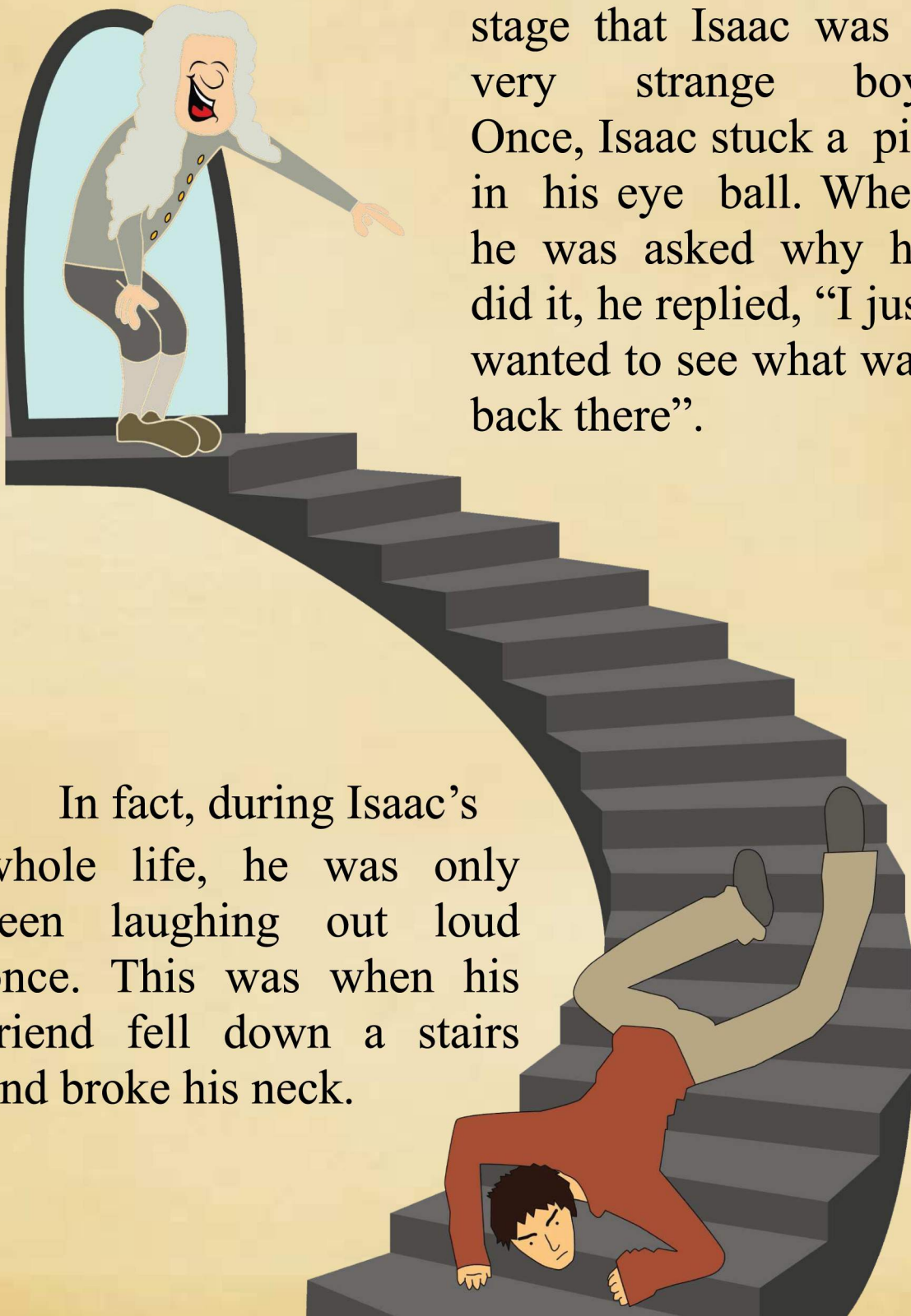
As Isaac grew up, he became very interested in time. He filled his room with twelve points to mark the hours of the day, so that his room became one big sun dial.

Isaac's hard work in school paid off as he was awarded a scholarship to attend university.



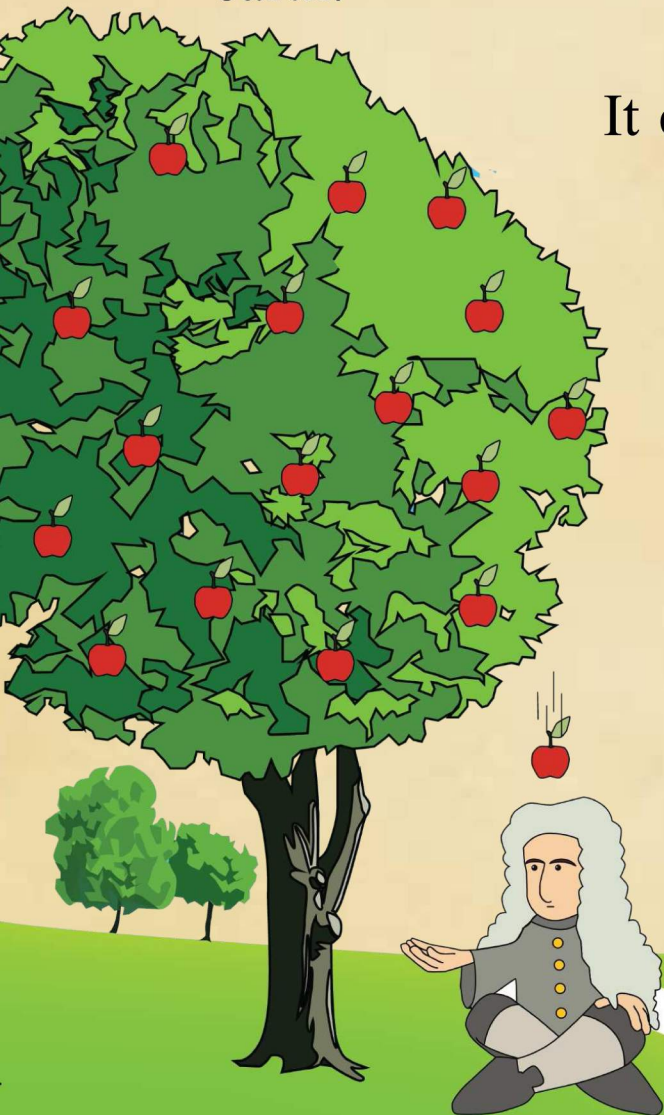
It was clear at this stage that Isaac was a very strange boy. Once, Isaac stuck a pin in his eye ball. When he was asked why he did it, he replied, “I just wanted to see what was back there”.

In fact, during Isaac’s whole life, he was only seen laughing out loud once. This was when his friend fell down a stairs and broke his neck.



Although Isaac was strange, he was also very clever. One day, when sitting under an apple tree, an apple fell on top of his head. This caused Isaac to think, “Why did the apple fall downwards? Why didn’t it fall upwards or to the side?” It was at this point that Isaac discovered gravity and that everything in the world gets pulled back to the centre of the earth.

It certainly was a great discovery and to this day he is considered to be one of the greatest mathematicians of all time.



## *~ Maths in the Sand ~*

2000 years ago, the Roman army lead by General Marcellus, was sweeping through Europe conquering all in their path. At the time, the Roman army was aiming to conquer Sicily, an island off the coast of Italy.



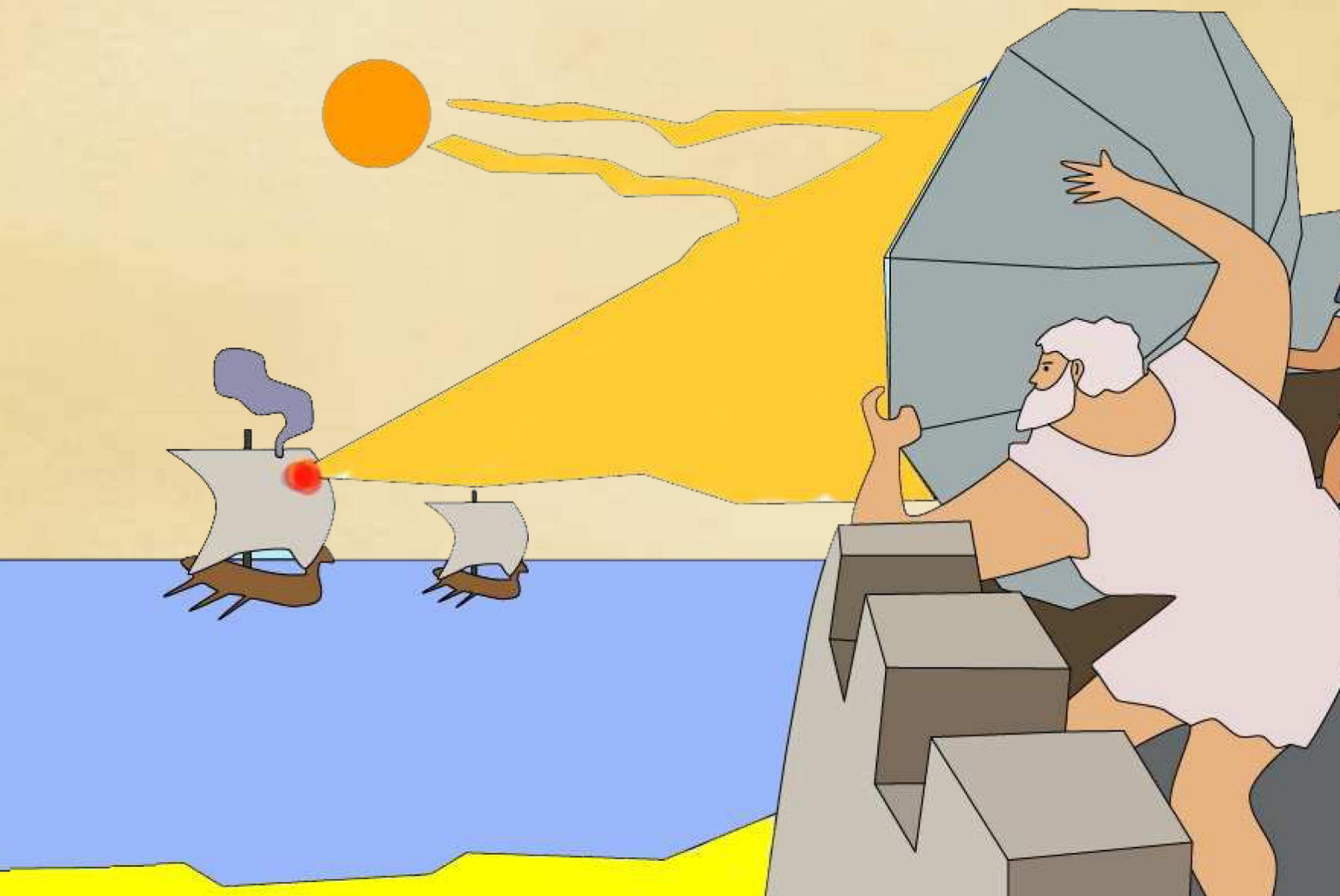


The King of Sicily, King Hieron, heard of the Roman army's plan to attack the island and sent the great mathematician and inventor Archimedes to work on trying to ensure the safety of Sicily.

Archimedes constructed huge weapons to protect Sicily from being conquered. He built a gigantic arm to smash Roman ships as they sailed close to the shore, as well as huge mirrors to reflect the sunlight onto the wooden ships and burn them.

For two years, Archimedes kept the Roman soldiers from landing on the Island. However, the Roman army was very strong and had some great warriors. After three years of trying, they finally got past the weapons made by Archimedes and entered the city of Sicily.

General Marcellus has much respect for Archimedes because he realised how clever he was and how great his inventions were. The General sent a soldier to find Archimedes on the island so that he could meet him.



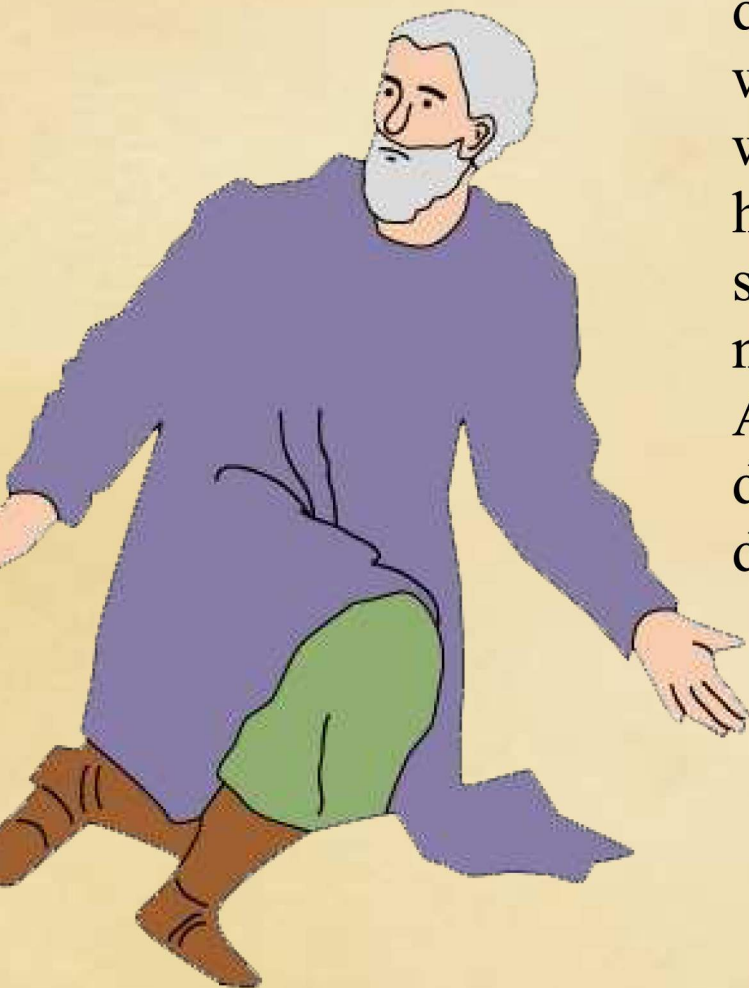
At the time, Archimedes was unaware that the city had been conquered by the Romans. He was busy trying to solve a maths problem on the beach, using a stick to write in the sand.





The soldier saw Archimedes and said, “Come with me back to General Marcellus straight away”. Archimedes replied, “I am not going with you until I finish this maths problem”. This enraged the soldier who drew his sword and killed poor Archimedes right then and there.

As Archimedes lay dead on the shore, the waves came in and washed away the maths he had written in the sand. Sadly, we will never know what maths Archimedes was discovering before his death.



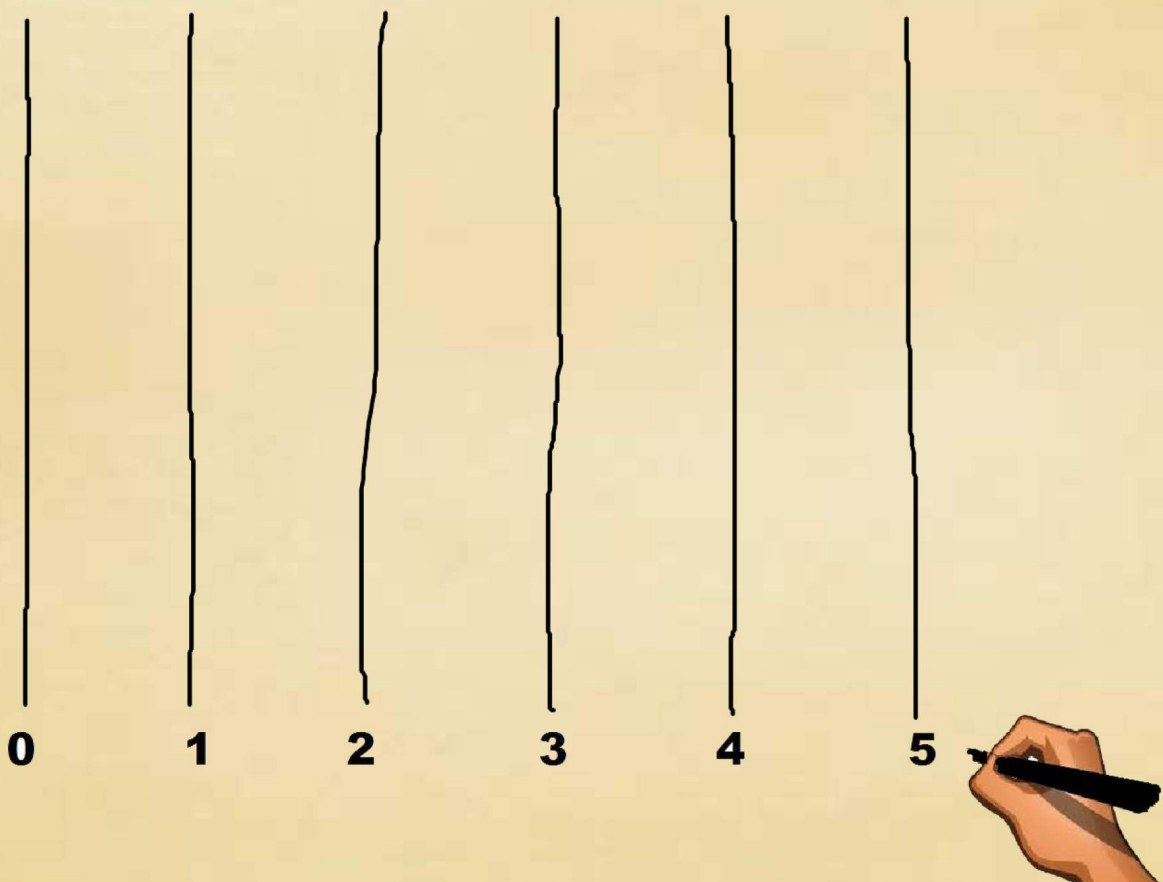
## ~ René and the Fly ~

About three hundred and fifty years ago in France, there lived a very sleepy man called René Descartes. René loved to stay in bed and think. He loved to think so much, that he was known as a philosopher. René asked the question, “How do I know I even exist?”. He came up with the answer and said, “I think therefore I am”. What he meant was that if he was able to think about the question, then he must exist in the first place.



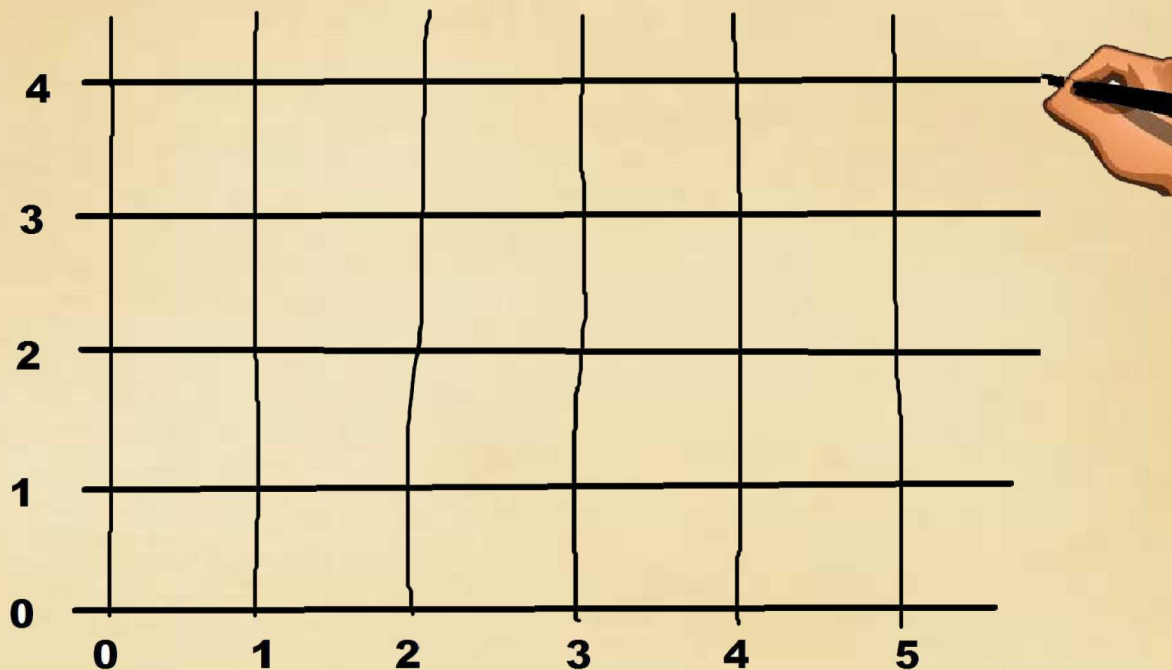
One day René was lying in bed looking up at the ceiling. Just then, a fly landed on it. The fly flew around and landed on the ceiling again. The fly continued to do this. “I wonder how I can record exactly where the fly lands on the ceiling each time?” said René .

Then he had an idea. With some charcoal, he drew vertical lines from the top of the ceiling to the bottom, and numbered each line.

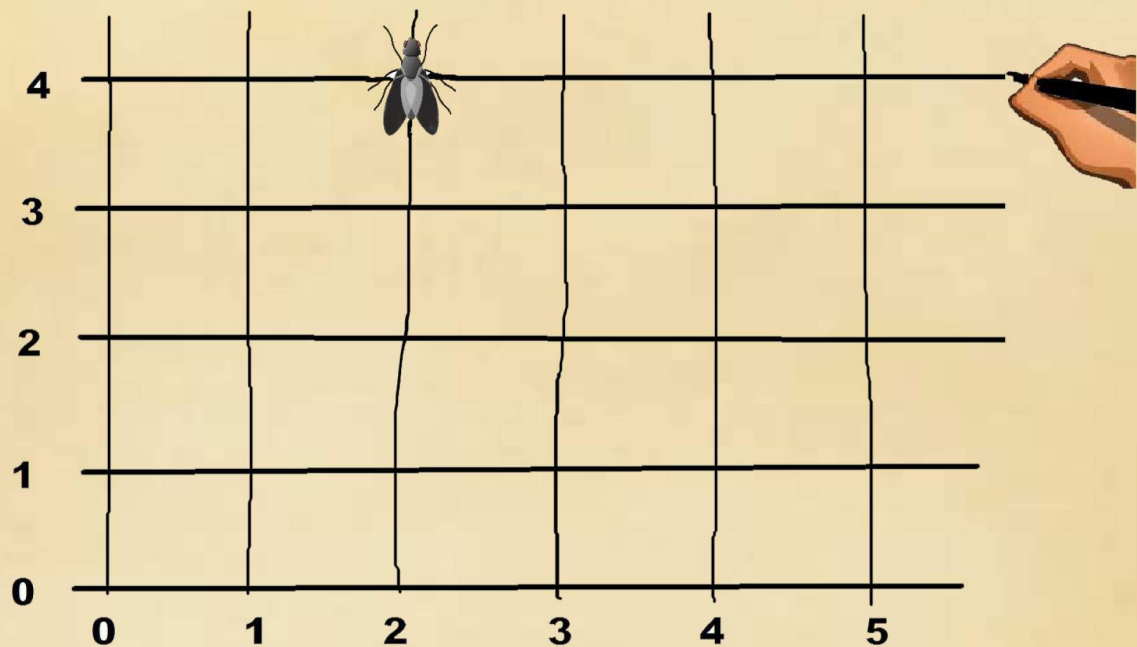




Then he drew horizontal lines across the ceiling, and numbered them also.



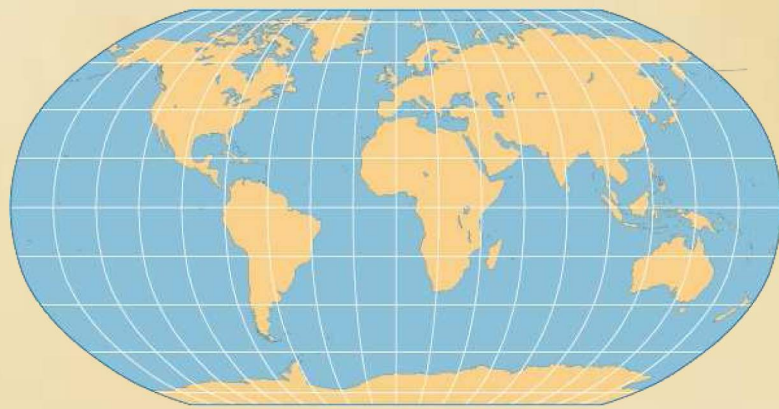
René watched as the fly landed on the ceiling. He then counted the lines across to see what vertical line the fly was on, and noted that it was 2. Next, he counted the lines up to see what horizontal line the fly was on and noted that it was 4.



René called the point that the fly was on 'the co-ordinate'. The first co-ordinate number showed how far the fly was from the left side of the ceiling. The second co-ordinate number showed how far the fly was from the bottom of the ceiling. So based on this method, René said that the fly was on the co-ordinate (2, 4).

René spent the day watching the fly and noting the co-ordinates that it landed on.

Over time, many people started to use René's idea and so it became known as the 'Cartesian Co-ordinate System'. Today we use it in maps, computers and TVs. I wonder what happened to the fly though!





## *~ Gauss the Genius ~*

In 1777, a genius boy was born in Germany. The boy's name was Carl Friedrich Gauss. This boy did some amazing things in maths from a very young age. When he was three years old, he saw an error in his father's wage slip and corrected it.



One day in school, Carl's teacher gave the class a difficult maths problem. He asked the class to add up all the numbers between 1 and 100. The students started to add  $1+2+3+4$  and so on, all the way up to 100, which the teacher thought would take them a long time.

However, Carl had the answer in a few seconds. He put his hand up and said "Teacher, I'm finished". The teacher thought Carl was lying and asked him for the answer. Carl said, "The answer is 5050". The teacher was astonished because this was correct. When the teacher asked Carl how he found the answer so quickly, Carl said, "It's easy, if you add 1 and 100 you get 101, 2 and 99 you get 101, 3 and 98 you also get 101. So this means you get 50 pairs of numbers which add to 101. If you multiply 101 by 50 you get 5050, and so 5050 is the answer".

The teacher was amazed. Little did he know that Carl would go on to become one of the greatest mathematicians that ever lived.



$$5=9$$
$$75+6=81$$

$$2+\sqrt{3}=$$
$$2^2+x=$$
$$\frac{2}{9}$$



## *~ Man, That's a Clever Girl! ~*

Over 250 years ago in France, there lived a clever little girl called Sophie Germain. At that time there was a lot of fighting in France due to the French Revolution. Because of this, Sophie's parents did not allow her outside the house. To pass the time, Sophie started reading her Dad's maths books. She became very interested in the story of how Archimedes died and from this developed a love for maths.

However, at that time women were not allowed to study maths, and for this reason, Sophie's parents tried to stop her reading the maths books. But Sophie persisted. Every night she would sneak down to the basement of the house with a candle and read when her parents were asleep.

As the years passed, Sophie became excellent at maths, especially in geometry and number theory. However, the problem for Sophie was that none of the great mathematicians at the time would take her work and opinions seriously because she was a woman.

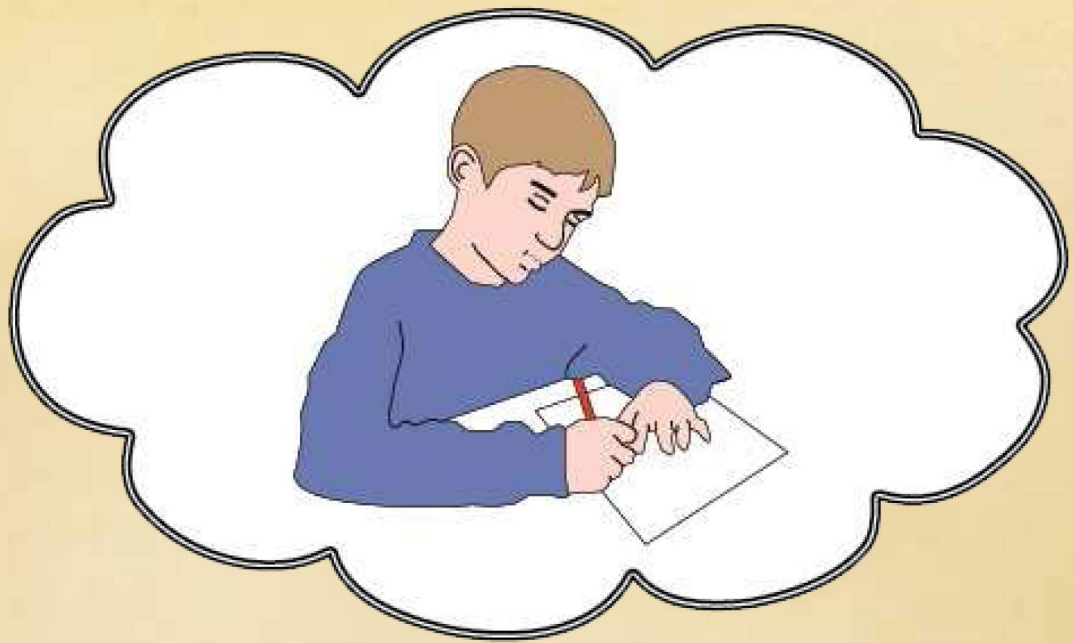


Tired of not being taken seriously, Sophie decided to pretend she was a man. She used the name M. Le Blanc.

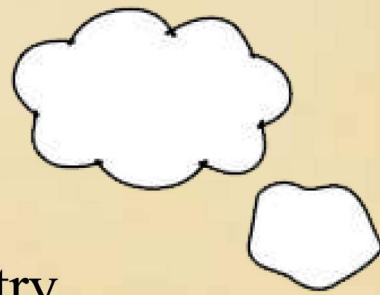
Now, under disguise, she sent letters to Carl Friedrich Gauss, who was the best mathematician in the world.





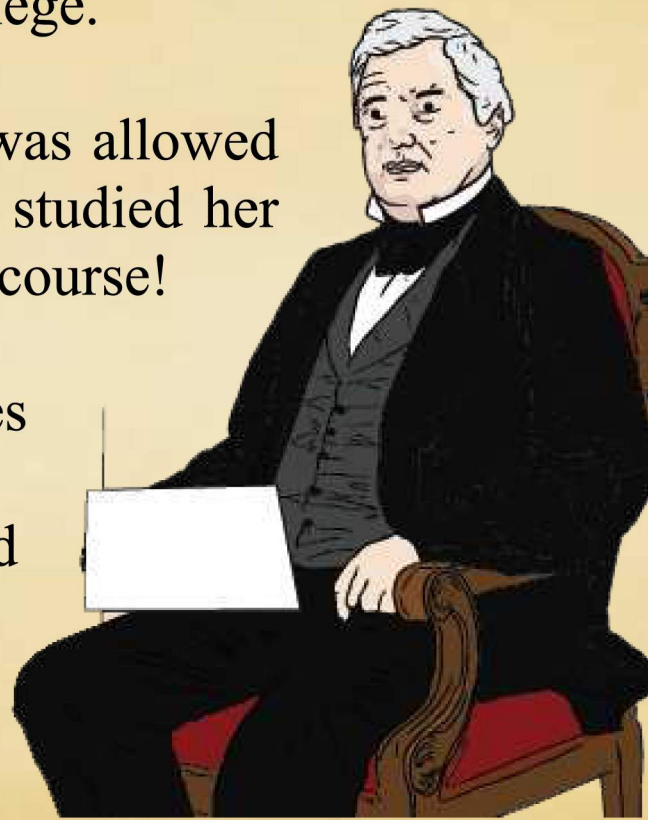


After three years, Gauss found out that Sophie was a woman. Instead of being angry, Gauss decided to try and help Sophie get into college.



Eventually Sophie was allowed to attend college where she studied her favourite subject - Maths of course!

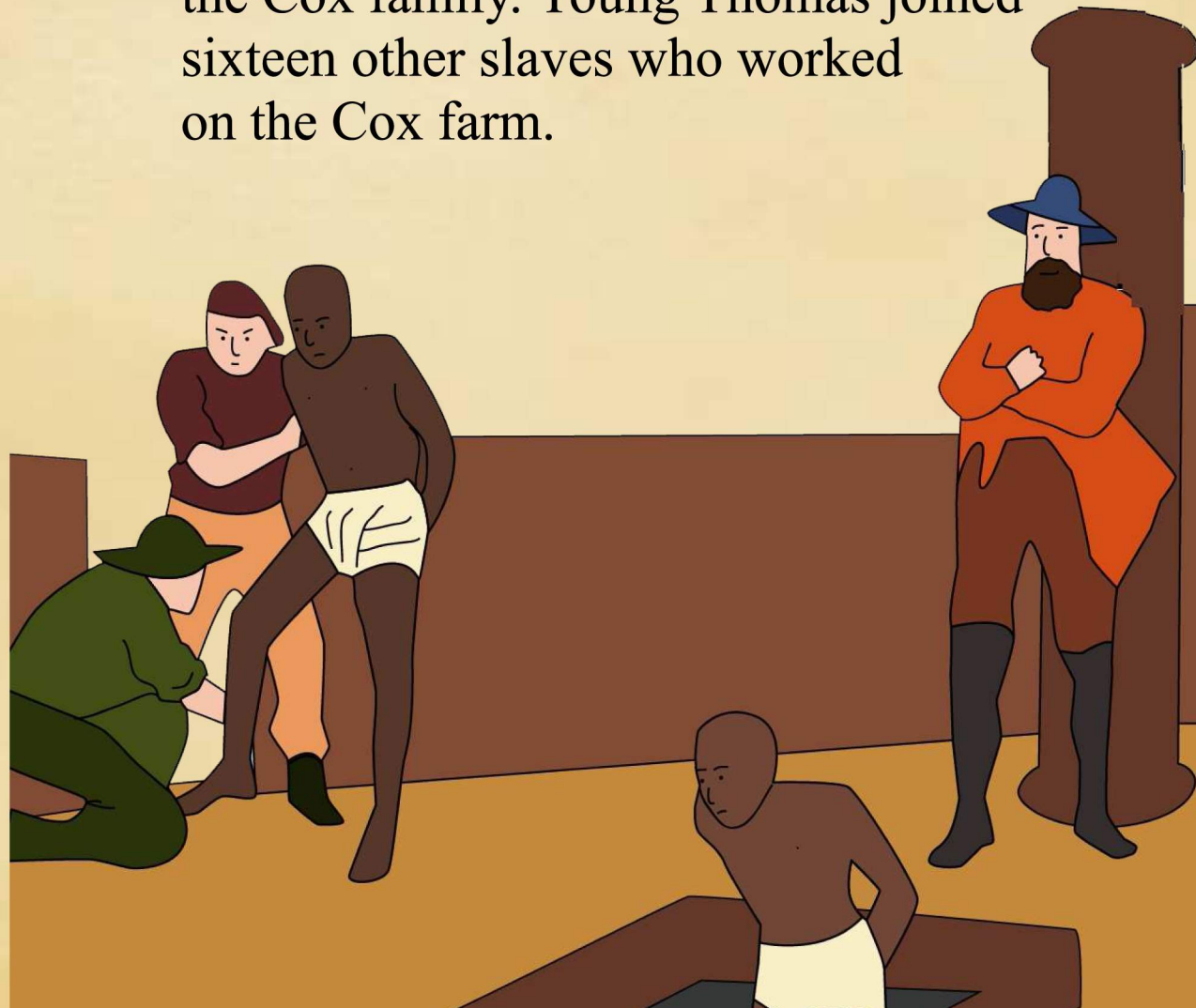
Her mathematical discoveries are used today to construct skyscrapers. Big cities would look a lot different today if it wasn't for Sophie.



## *~ The Wonderful Slave ~*

Over 300 years ago in North Africa, there lived a young boy called Thomas Fuller. At that time, men from America would capture young boys in Africa and bring them across the sea to work as slaves.

When Thomas was fourteen years old, he was captured and sent to America to work for the Cox family. Young Thomas joined sixteen other slaves who worked on the Cox farm.



Thomas, along with the other slaves, had to work hard all day for no money and was not allowed to attend school. Even though Thomas could not attend school, he was brilliant at maths and was able to add huge amounts of numbers together in a matter of seconds.

After some time, the Cox family realised just how good at maths Thomas was and started to tell people about their clever slave. Word quickly spread across America of Thomas' ability with numbers.

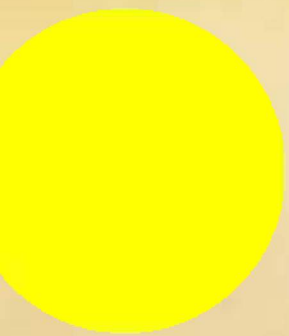
One day two mathematicians came to see Thomas. They said to him, "Thomas, we have heard you are gifted at maths. Answer this question". "How many minutes are there in 70 years, 17 days and 12 hours?" Thomas thought for a few seconds and then said, "2,210,500, 800 minutes, Sir".



One of the men then worked out the problem on paper and informed Thomas that he was wrong. Thomas quickly replied, “You forgot the leap years, Sir!”







Sure enough, when the mathematician added the leap years into his calculations, he realised Thomas was correct.

Poor Thomas remained a slave for the rest of his life. Even though he never got the chance to learn how to read or write, he was still a mathematical genius.



## *~ Yi and the Brick ~*

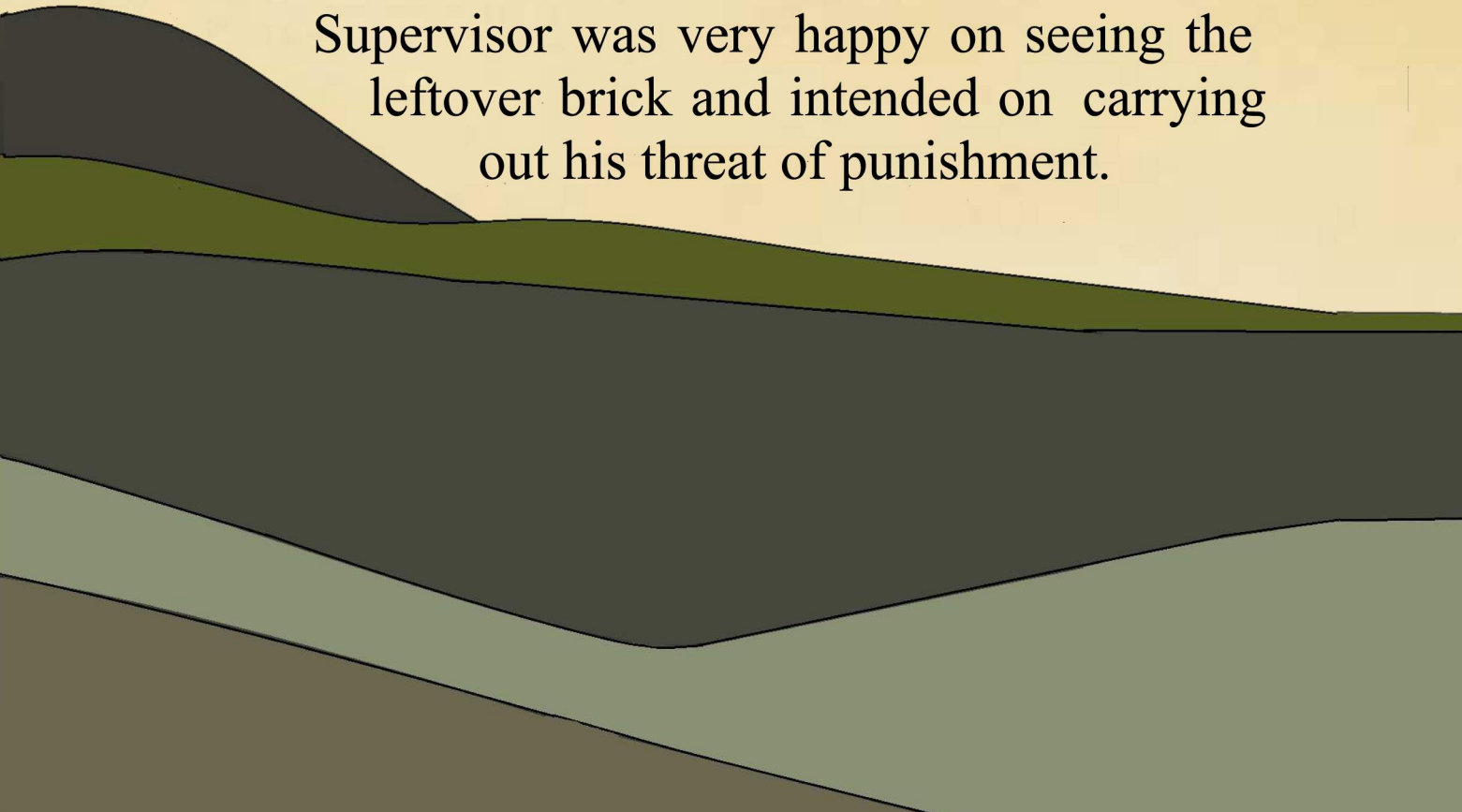
Over 600 years ago, the Mongolians were aiming to attack China. For this reason, Emperor Ming began to construct a huge wall to prevent the Mongolians from advancing onto Chinese land. On this wall was to be constructed a splendid landmark called the Jiayuguan Pass.





During its construction, one of the workers, called Yi Kaizhan, told his Supervisor that it would take exactly 99,999 bricks to build the landmark. This supervisor was a very cruel man and did not believe Yi. “If you have miscalculated by even one brick then I will condemn all the workers to three years hard labour and you will be beheaded as punishment for your foolishness” said the Supervisor.

When the Jiayuguan Pass was complete, there was one brick left over. The cruel Supervisor was very happy on seeing the leftover brick and intended on carrying out his threat of punishment.



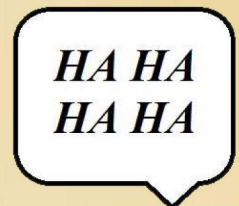
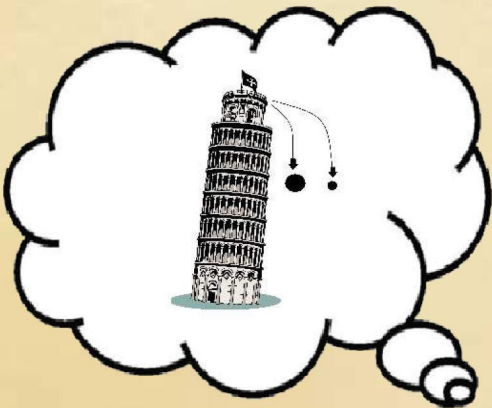
However, as well as being good at maths, Yi was also a very clever man. Just then Yi hatched a plan that would save him and the workers from the punishment. “Do not move that brick!”, shouted Yi. “For it was put there to strengthen the Jiayuguan Pass and if it is moved then the whole landmark will fall”. The silly, cruel Supervisor believed Yi and to this day the brick still remains in its original place.





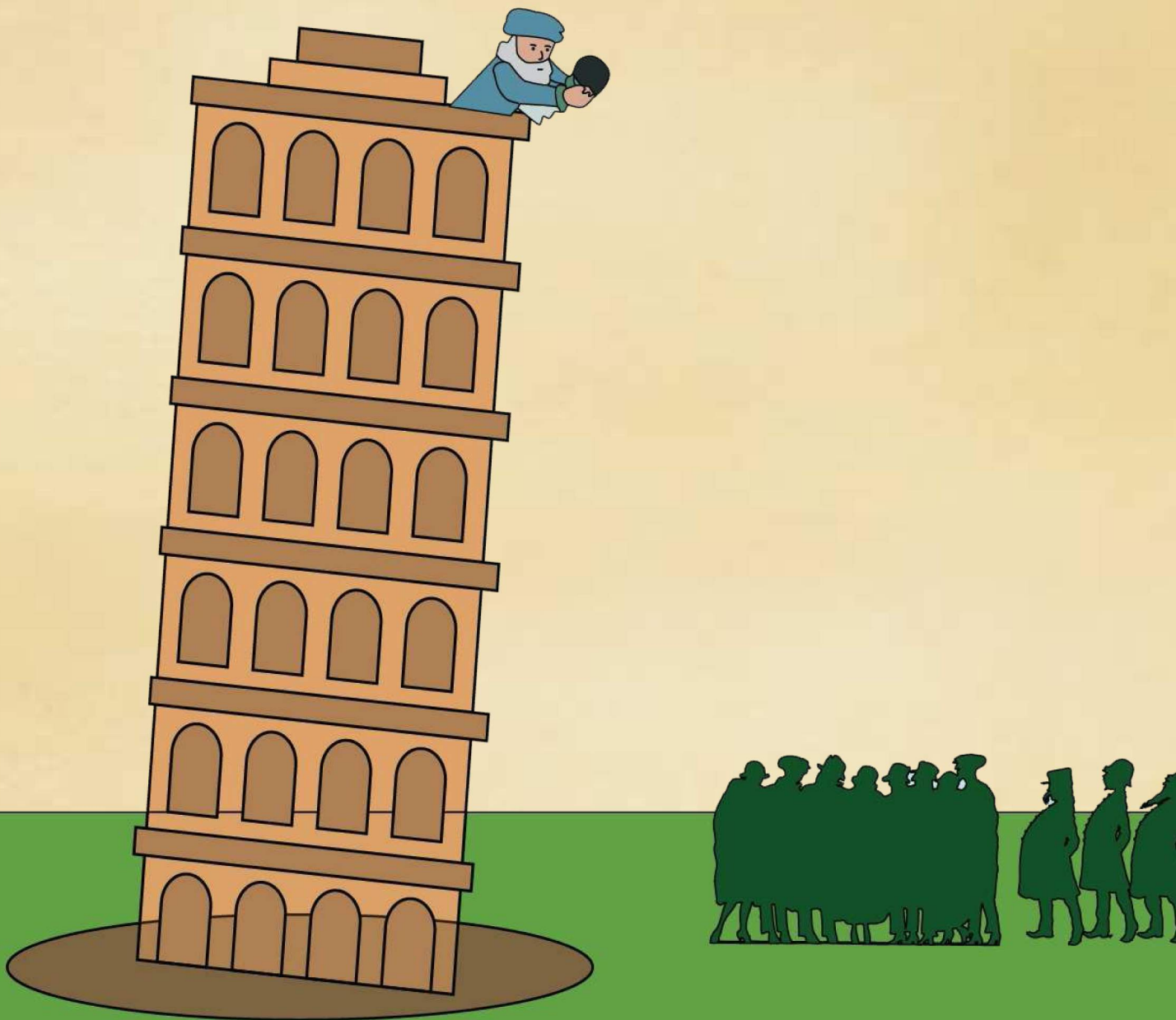
## ~ Clever Galileo ~

Heavy things fall faster than light things, don't they? For hundreds of years, that is what people thought. However, a professor called Galileo wanted to prove that this was wrong. Many people thought Galileo was a crazy man and laughed at what he was trying to do. "Look at that nutcase trying to prove Aristotle's age-old theory wrong", they would say. For it was Aristotle, the great Greek mathematician, who first said that the heavier an object is, the faster it falls.





One day, Galileo got two of his students to carry a light ball and a heavy ball to the Leaning Tower of Pisa. “I am going to climb up the tower with the two balls and push them off the top of it at the same time and see what happens” said Galileo.



As Galileo set off climbing up the tower, the people who were watching started to mutter, “It’s obvious the heavy ball will hit the ground first”.

Just then, Galileo pushed both balls from the top of the tower. BANG! They hit the ground below. But the amazing thing was that the people only heard one BANG!. This was because Galileo was right! Both balls fell at exactly the same speed and hit the ground at the same time.

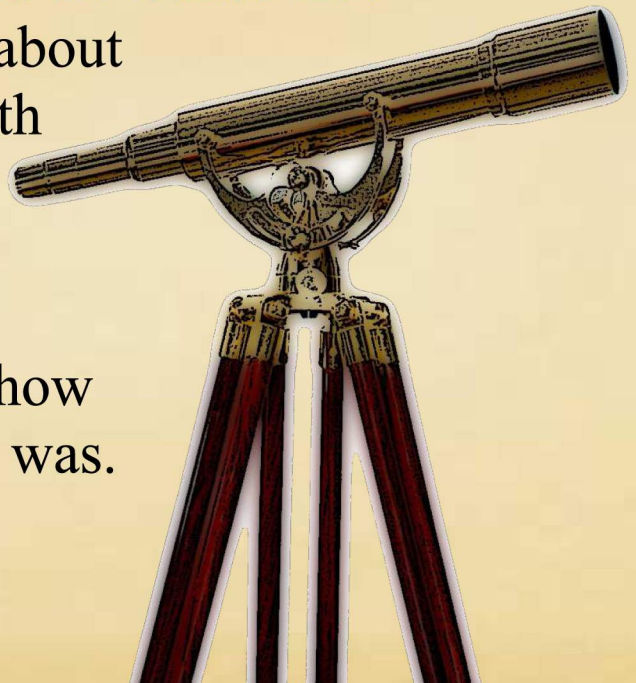
Galileo was delighted, but when he came down from the tower, everybody had left. They all thought he was playing a trick on them and still didn’t believe him. Poor Galileo was so disappointed.

Around the same time, Galileo was also inventing the telescope. This telescope would prove what Galileo had always thought: That the earth was not the centre of the universe, but instead was one of many planets that revolved around the sun.

The catholic church was very angry with Galileo for suggesting such a thought, because they believed that the earth was the centre of the universe. For this reason they threw poor Galileo in jail where he went blind.

Years later, we would all realise that everything Galileo said about falling items and the earth moving around the sun was true.

We now know just how clever Galileo really was.

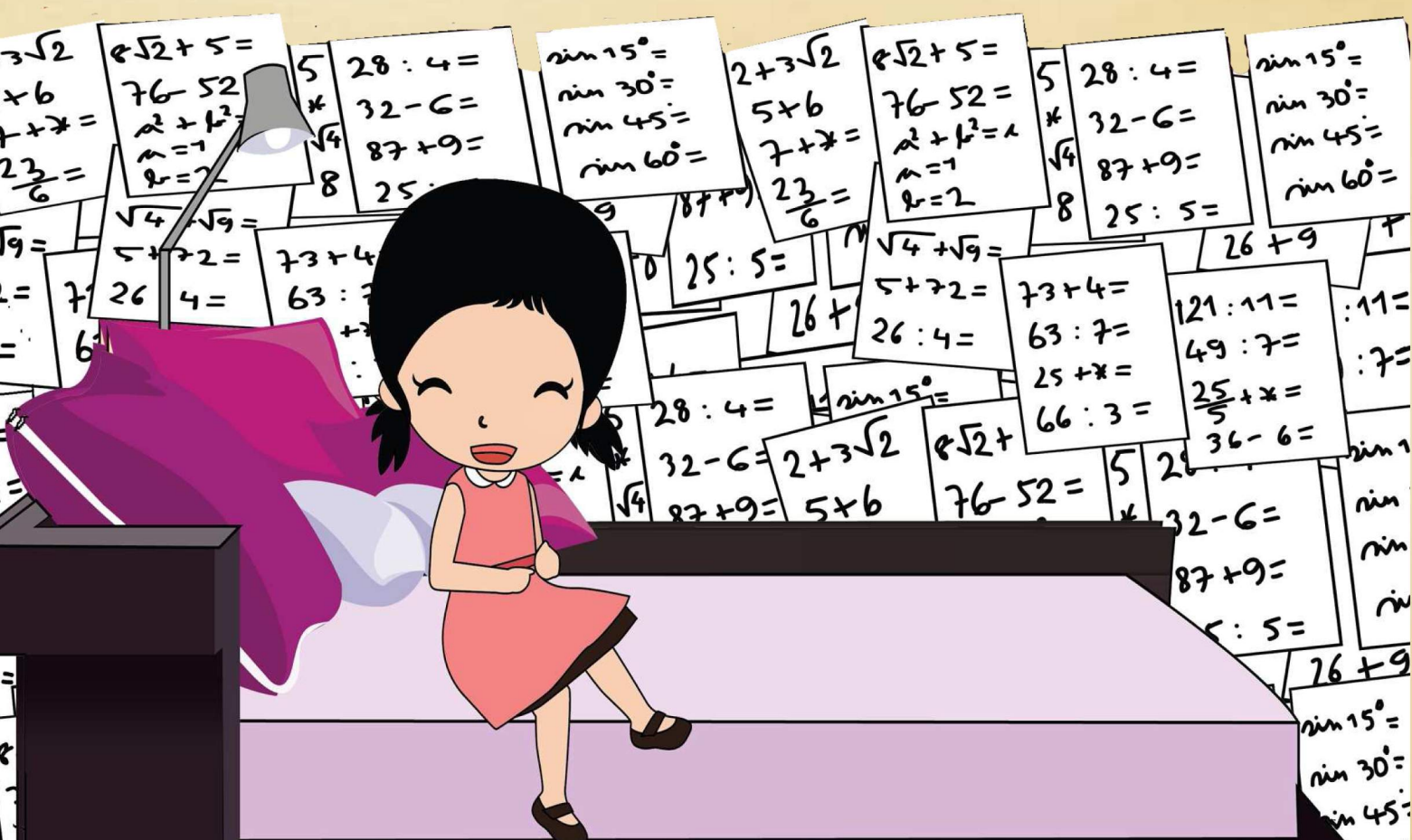






## ~ Sonja and the Maths Wall ~

Over 150 years ago in Russia, there lived a little girl called Sonja. One day, Sonja's dad was wallpapering the house. However, he did not measure correctly and did not buy enough wallpaper to cover Sonja's bedroom. Sonja's dad did not want to admit that he had made a mistake. So instead of simply ordering more wallpaper, he decided to cover Sonja's bedroom walls with pages from an old calculus maths book he had.



Every night she would look at the maths on her wall and over time developed a love for the subject. But at that time in Russia, maths was seen as a subject only for men. So Sonja wanted to move to Europe to further her studies. But customs would not allow a girl live abroad unaccompanied. So Sonja hatched a plan to marry a man and travel to Europe with him.

After several months, she met and married Vladimir Kovalevsky and travelled to Austria, England and finally Germany.

In Germany, she studied maths, amazed the professors with her genius and became very famous.



All because her father wouldn't buy more wallpaper.



## *~ John and the Blonde Girl ~*

About 50 years ago, a clever boy called John Nash was at a dance. John and his friends were very shy boys and did not have girlfriends.

At the dance, there was a beautiful girl with long, blonde hair and all of John's friends asked her to dance with them. However, her reply to each boy was the same, "No, thank you!"

John noticed how all of the boys were trying to dance with the blonde girl and in the end they all ended up with no girl to dance with.



So John came up with an idea. “Let’s agree that none of us will ask the blonde girl to dance, but instead ask the brown-haired girls”, said John to his friends. But none of the boys would agree with John as they thought he was trying to trick them.

John’s observations about the blonde girl helped him develop a maths idea known as 'Game Theory', in which he discovers it is better for people to work together than on their own. This idea made John very famous.

Later in his life, John sadly developed an illness called schizophrenia. This caused him to see things that didn’t exist. However, he has learned to cope with his illness thanks to the help of his lovely wife, Alicia. They now both live happily in America, where John continues to discover new maths. Alicia has brown hair by the way!





## ~ A Massive Number ~

A 'Million' is the word for 1,000,000. A  
 'Billion' is the word for 1,000,000,000. A  
 'Trillion' is the word for 1,000,000,000,000. But  
 what is the word for 10,000,000, 000,000,000,0  
 00,000,000,000,000,000,000,000,000,000,0  
 00,000,000,000,000,000,000,000,000,000,000,  
 000,000,000,000,000,000? (This number has  
 100 zeros)

In 1938, Dr. Edward Kasner asked his 9 year old nephew, Milton, to come up with a word for this gigantic number. The little boy decided the number should be called a 'Googol'.

Interestingly, an internet search engine is named after this number. However they spelt Googol incorrectly as 'Google'!

The Google logo is displayed in its characteristic multi-colored font (blue, red, yellow, blue, red, green) against a light beige background.



## *~ The Vanishing of 11 Days ~*

1700 years ago, the calendar used by most of the world was called the 'Julian Calendar'. This calendar was drawn up by mathematicians who calculated that a year was 365 days, 6 hours long.

Over 1200 years later, mathematicians would calculate more precisely, that a year was 365 days, 5 hours, 48 minutes and 46.08 seconds. This meant that the original Julian Calendar was wrong by 11 minutes every year. So a new calendar called the 'Gregorian Calendar' was introduced.

In 1592, the Vatican ordered every Christian country to change from the Julian Calendar to the new Gregorian Calendar. Every Catholic country did what the Pope said, except England who stayed using the Julian Calendar. Because of this, England was 11 minutes behind the rest of Europe each year.

By 1752, these 11 minutes had added to 11 days. So England was a full 11 days behind the other countries in Europe.

To catch up, King George ordered that the day after September 2nd would be September 14th. This confused people because they felt as though their lives had been shortened by 11 days.



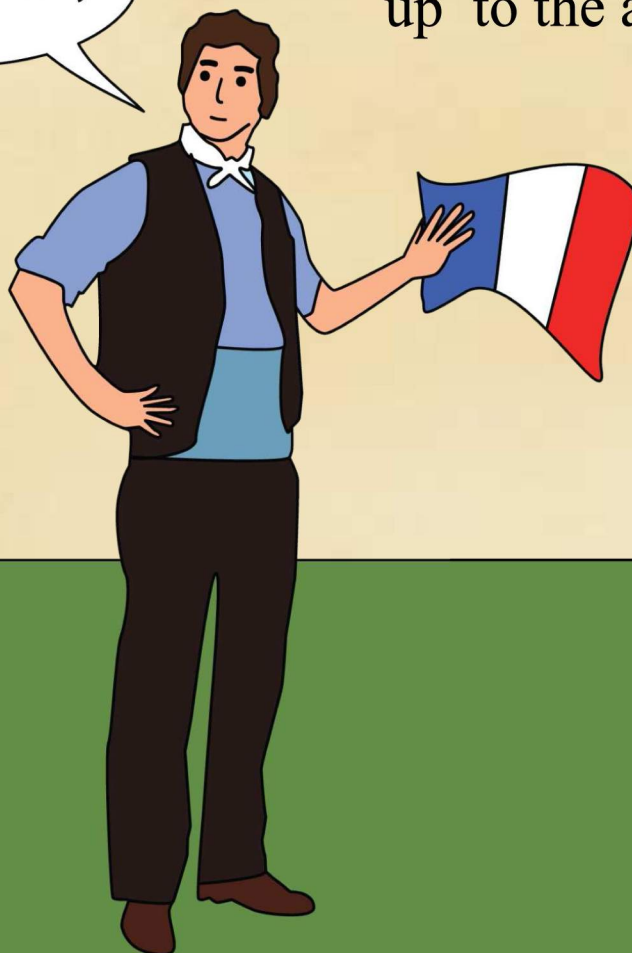
Birthdays, appointments and days at work had just vanished into thin air. People were chanting in the streets, “Give us back our eleven days”.

Mathematicians still say that the Gregorian Calendar is slightly inaccurate and in 3000 years time it will have to be adjusted by 1 day.



It's Wednesday

But shall we just leave that  
up to the aliens?





## *~ Albert and the Bomb ~*



$$E=mc^2$$

Many years ago in Germany, there lived a very clever man called Albert Einstein. Einstein proved that big explosions can come from small objects.

At the same time, a very bad man called Adolf Hitler was in charge of Germany and was planning on taking over the world. Hitler heard about the possibility of making big explosions from small objects and started trying to make an atomic bomb that would destroy his enemies.



Einstein was afraid of what Hitler would do if he succeeded in making the atomic bomb. So he wrote a letter to America telling them of his discovery and urged them to try and create an atomic bomb before Hitler did.

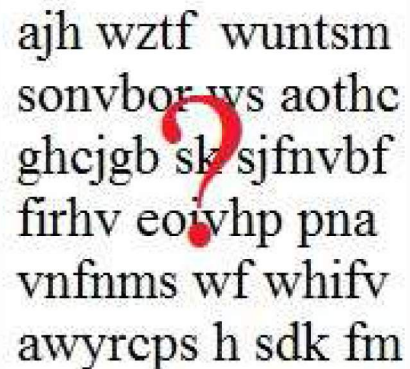
America set to work on creating the bomb and with the help of the clever Einstein they eventually succeeded. In 1945, America dropped the bomb and with one massive explosion won the war.



## ~ Solving the Enigma ~

During World War II, the Germans developed a machine called 'Enigma'. This machine allowed them to send coded messages to each other, which their enemies could not understand. This meant that they could plan attacks without their enemies knowing. Because of this, Germany was winning the war.

England and other countries were very worried because they could not read the German's coded messages and for this reason were losing the war. The English had many mathematicians trying to crack the codes that they intercepted, however they were all failing.

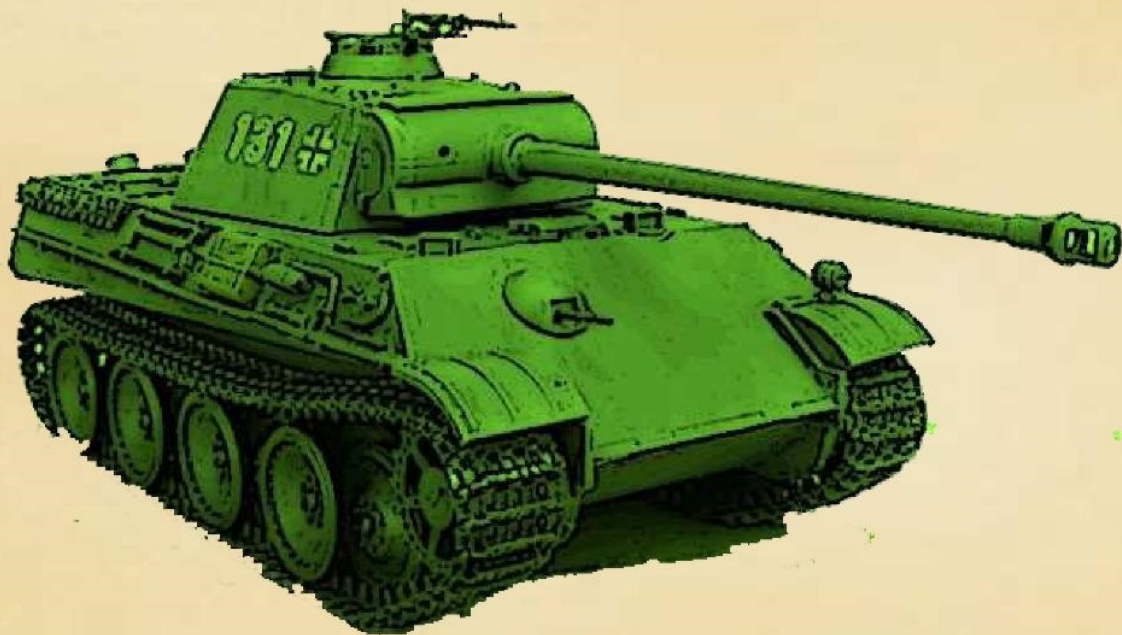


ajh wztf wuntsm  
sonvbor ws aothc  
ghcjgb sk sjfnvbf  
firhv eoivhp pna  
vnfnms wf whifv  
awyrcps h sdk fm



Then, two mathematicians called Alan Turing and Gordon Welchman, along with the help of Poland, came up with an idea to build a machine that could solve the codes.

After 8 months of hard work, they finally succeed in building "Bombe", which was a machine able to crack the Enigma code. Thanks to Bombe, Germany was defeated and 14 million lives were saved.



## *~ The Generous Mathematician ~*

In 1917, there lived a clever 4 year old boy called Paul Erdős in Hungary. Paul was excellent at maths. If given a person's age, he could calculate in his head, how many seconds that person lived.

As Paul grew older, he adopted a simple life. Most of his possessions would fit in one suitcase. He often gave his money and awards to people in need and to charities. Paul also offered cash prizes to people who could solve certain unsolved maths problems.



In 1996, Paul died at the age of 83. To this day, there still exists unsolved maths problems for which Paul offered money. His good friend, Ronald Graham, continues to pay the prize money offered by Paul.

There is currently a prize of \$5000 offered for the solution to the maths problem known as 'Erdős Conjecture'. If you study hard enough, you might just solve it!!

<u><b>Bank of Maths</b></u>		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <small>PAY</small> <b><i>You.....if you study hard enough</i></b> </div> <div style="width: 5%; text-align: center; font-size: small;">NOT NEGOTIABLE</div> <div style="width: 50%; padding-left: 10px;"> <small>DATE</small> _____ </div> </div>		<small>OR BEARER</small>
<small>THE SUM OF</small> <b><i>Five thousand dollars</i></b>		<b>\$</b> <span style="border: 1px solid black; padding: 2px 10px; font-family: monospace;">5000</span>
<small>⑈96332⑈ 020⑈ 201⑈50321⑈3125⑈</small>		



# *Glossary*

**Right Angle Triangle:** A triangle with one angle measuring  $90^\circ$ .

**Irrational Number:** A decimal number, that goes on forever, without repeating.

**Theorem:** A statement that has been proven.

**Ratio:** A relationship between two numbers of the same kind e.g. 3:2.

**Persia:** The name given to old Iran and its border countries.

**Geometry:** Branch of maths which looks at size, shape and position.

**Particles:** A tiny piece of matter.

**Probability:** A branch of maths that looks at how likely something is going to happen.

**Gravity:** A force that attracts an object to the centre of the earth.

**Philosopher:** A philosopher studies philosophy, which is the study of the world, people and society.

**Vertical Line:** A line that runs from top to bottom or bottom to top.

**Horizontal Line:** A line that runs from right to left or left to right.

**Mongolians:** Native people of Mongolia, a country that lies between Russia and China.

**Number Theory:** A branch of maths that looks at the relationship between numbers.

**Aristotle:** An Ancient Greek philosopher, scientist and mathematician. He is seen as one of the greatest philosophers of all time.

**Leaning Tower of Piza:** A tower, which stands in the Italian city of Piza, that tilts to one side.

**Calculus:** Branch of maths which studies rates of change. This includes change of speeds and acceleration.

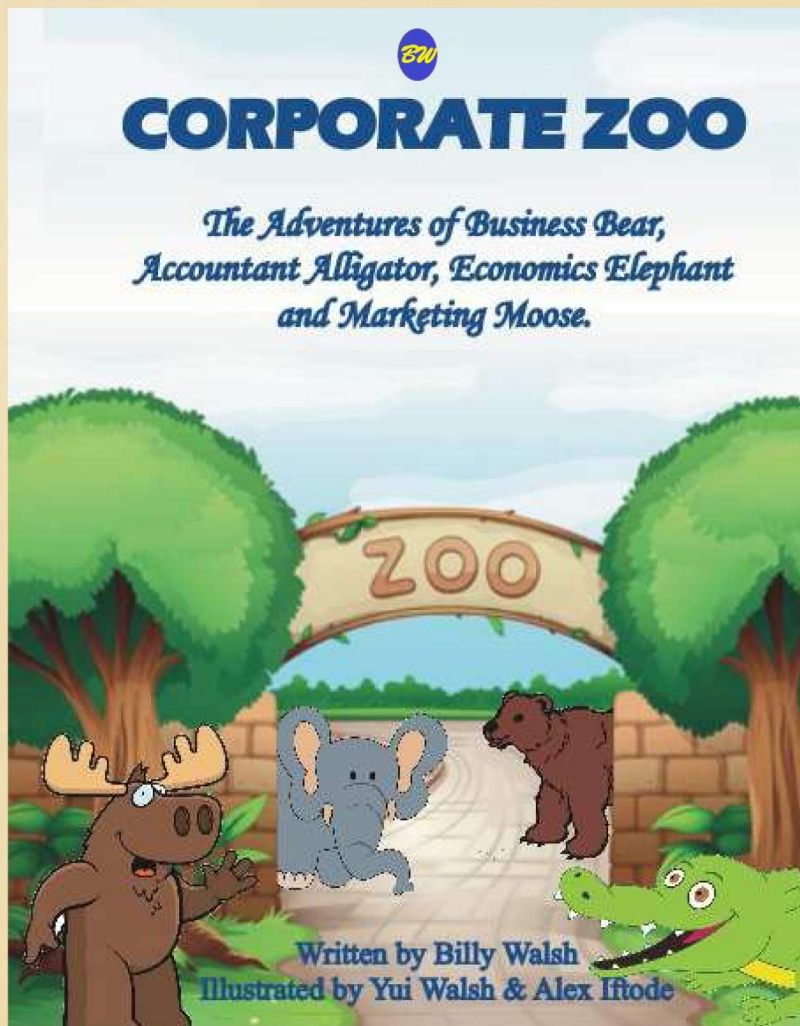
**Game Theory:** A study of strategic decision making.

**Schizophrenia:** An illness which makes it difficult for a person to distinguish between what is real and what is not real.

**Atomic Bomb:** A bomb that produces a powerful explosion when atoms are split apart.

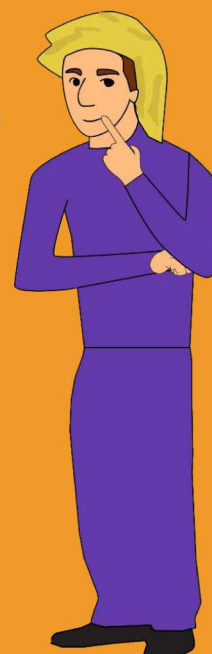
If you enjoyed '*Maths Heroes*', why not check out '**CORPORATE ZOO**', which introduces children to the world of Business Studies, Accountancy, Economics and Marketing.

Follow Business Bear, Accountant Alligator, Economics Elephant and Marketing Moose as they use their knowledge to help the other animals in the Zoo.



To purchase, go to [www.facebook.com/corporatezoo](https://www.facebook.com/corporatezoo)





*Maths Heroes* is a wonderful collection of stories and tales from the history of maths. Read about the inventions of Archimedes, the crazy doings of Newton, how one mathematician became an assassin and much more.

*Maths Heroes* brings the wonderful world of mathematics to life with every page.

