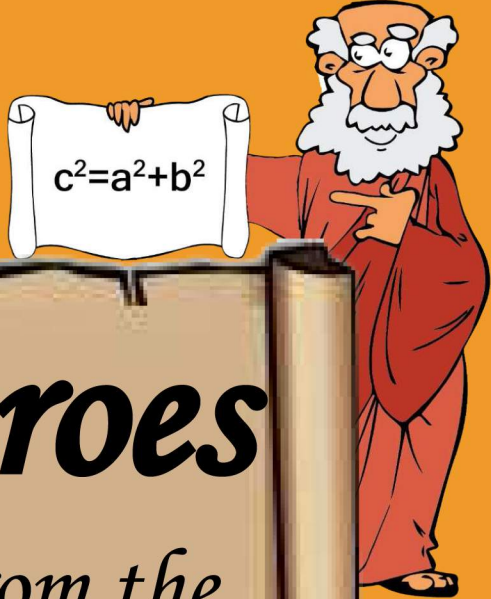




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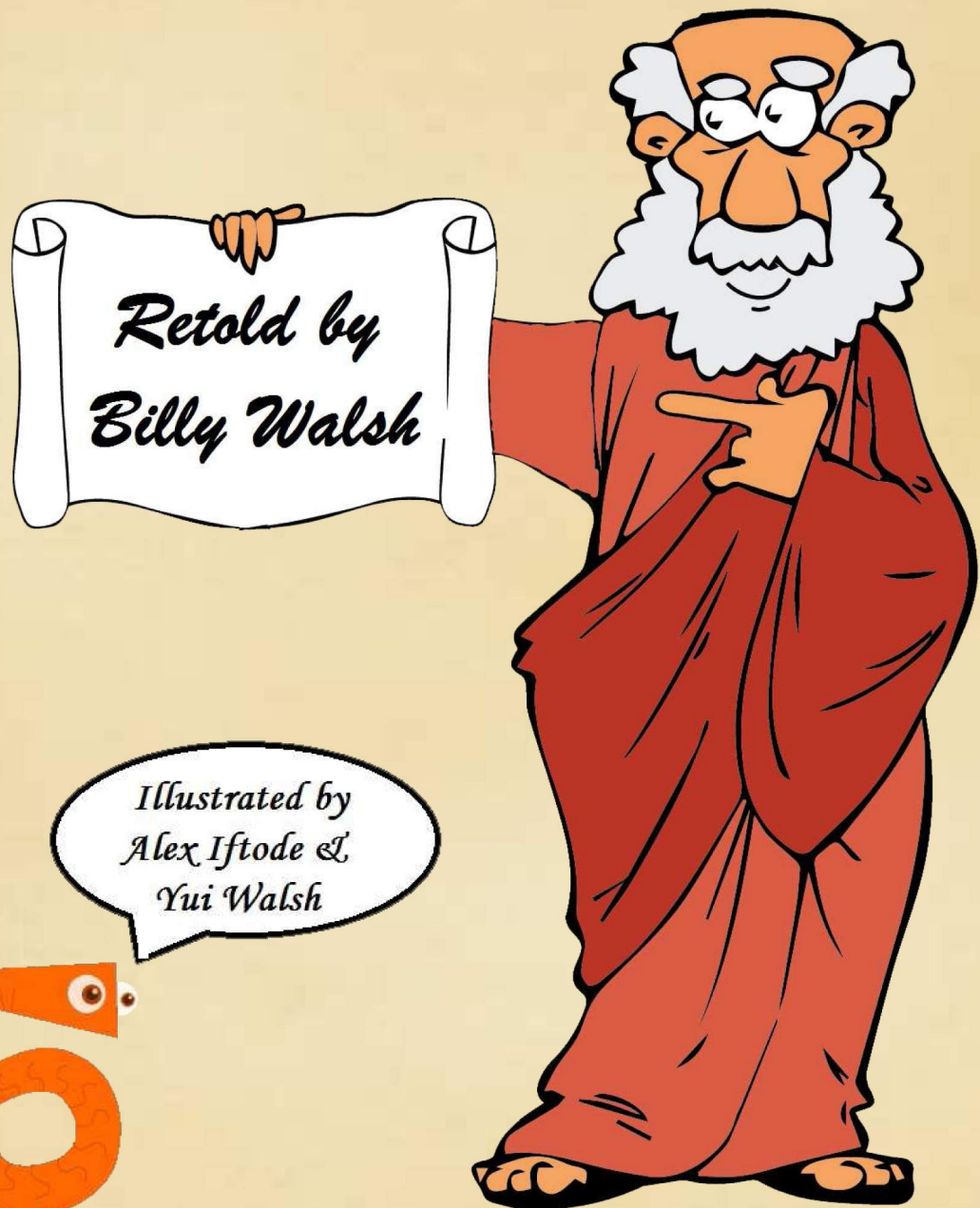
Maths Heroes

*Historical Stories from the
Amazing World of
Mathematics*



*Written by Billy Walsh
Illustrated by Alex Iftode & Yui Walsh*

Maths Heroes



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Note from the Author



"When introducing a maths topic to my class, I try and incorporate a story from its history, to engage the students' imagination and generate interest among them. I have found that students love to hear stories and anecdotes regarding maths and its brilliant, and sometimes crazy, mathematicians. So much so, that they suggested I write a book with these stories in it. After the birth of my daughter Caitlin, I had time to contemplate, and decided that I was going to follow the instructions of my students and commenced writing the book."

"I believe Maths has a history and a mythology that rivals any of the great stories from Irish, Greek and Egyptian folklore. It is my aim, through this book, children will develop an interest in, and indeed a love for, the great subject that is maths. I hope you have as much fun reading it as I had in creating it."

For Yui, Caitlin, Dad, Mam, Croíadh, Rian and Doireann

Billy Walsh MA, BA, BB, PDE, PDM, Cert. Ed.

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~ Pythagoras the Murderer ~

Over 2500 years ago, in ancient Greece, there lived a very clever man called Pythagoras. Pythagoras was the head of a group of people called the Pythagoreans.

These Pythagoreans were a strange group indeed. They worshipped numbers and thought that each number had a special meaning. They believed that the number '2' was a symbol for opinion, the number '3' was a symbol for harmony and the number '4' was a symbol for justice. The Pythagoreans said that odd numbers were “girl numbers” and even numbers were “boy numbers”. They also believed that they could talk to animals and that it was evil to eat black beans.

Even though these Pythagoreans were a strange bunch of people, they were also extremely good at maths. They discovered interesting things about triangles, circles and even music.

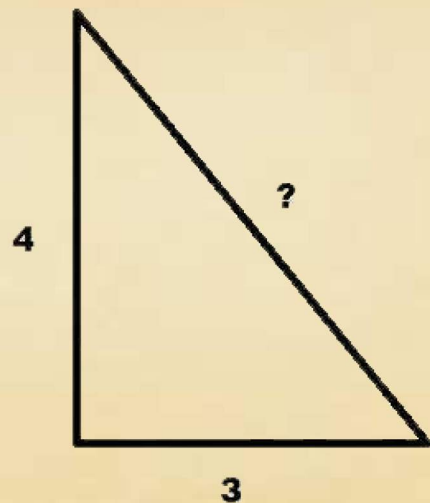
One interesting discovery they made, was that in a right angled triangle, if they had the length of two of its sides, they could find the exact length of the missing side. To do this they used a special type of formula known as 'Pythagoras' Theorem'.



One day, one of the Pythagoreans named Hippasus was solving a maths question using the theorem. However, Hippasus stumbled upon a problem. For some strange reason, the answer he got from using the special theorem was a really long number. It was as if this number never ended. Because the number seemed to continue on forever, Hippasus could not find the exact length of the missing side of the triangle that he was working on.

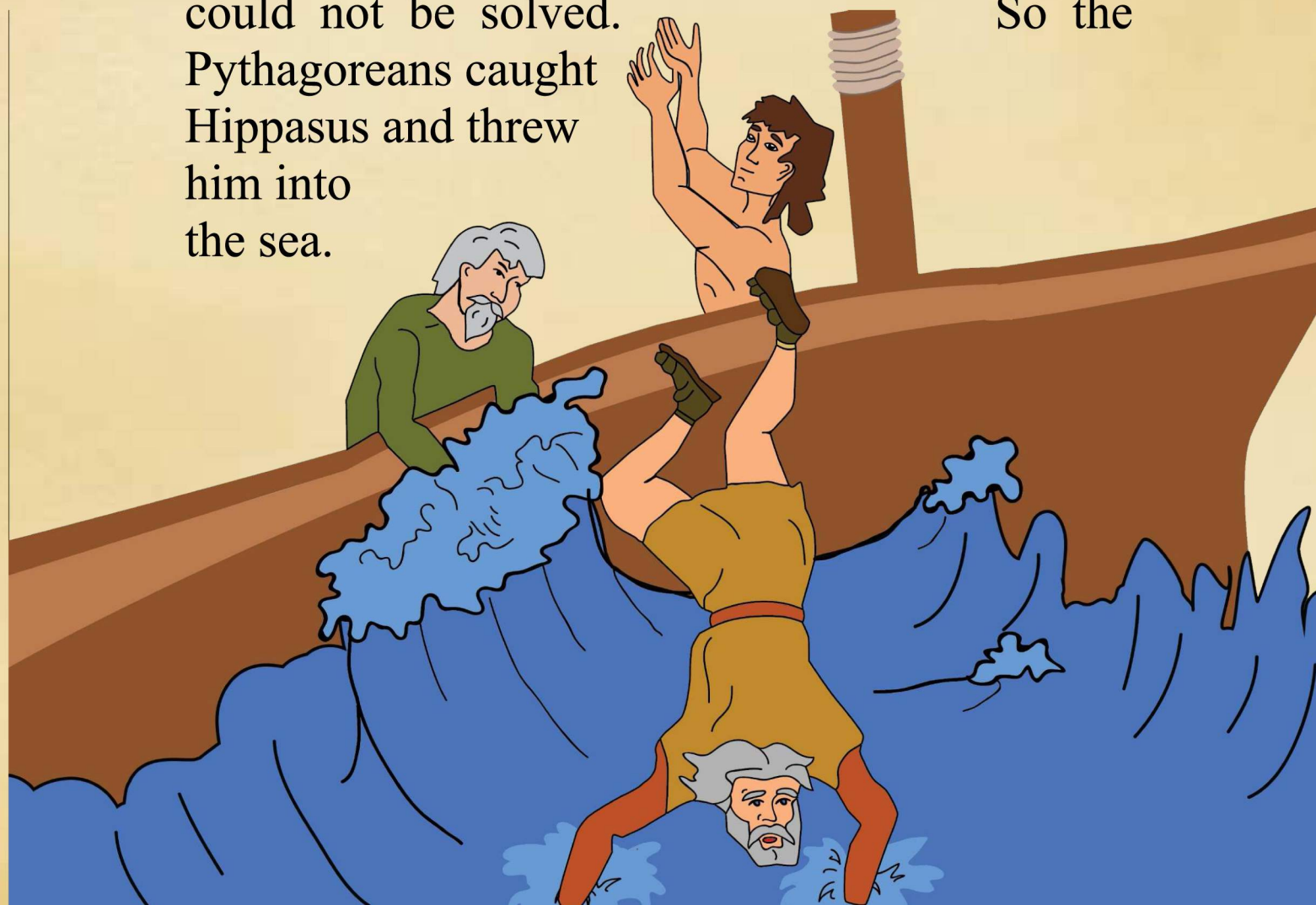
Hippasus told Pythagoras what had happened and this caused Pythagoras to worry that maybe there was a problem with his theorem.

Pythagoras said to Hippasus, “Don’t tell anyone about your discovery, not a soul. If you do, then my magical theorem might be proven not to be so magical after all”.



But Hippias liked to gossip and he started telling people about the maths problem that the theorem could not solve. Pythagoras was furious that Hippias was telling people about his discovery.

One day, the Pythagoreans were out at sea on a boat. Pythagoras demanded that Hippias be thrown overboard so that he could not tell anyone else about the strange sum that could not be solved. So the Pythagoreans caught Hippias and threw him into the sea.



Hippasus drowned, but soon people found the reason why the strange sum was giving a very strange answer. It was not that the theorem did not work, rather it was because the answer to the sum was a special number that had never been seen or discovered before. A number so long that it went on and on forever. A number that continued into what is known as 'Infinity'. This strange type of number became known as an 'Irrational number' and was the reason that poor Hippasus came to his death.

**Irrational numbers go on
and on forever and ever....**



~ The Chessboard of Rice ~

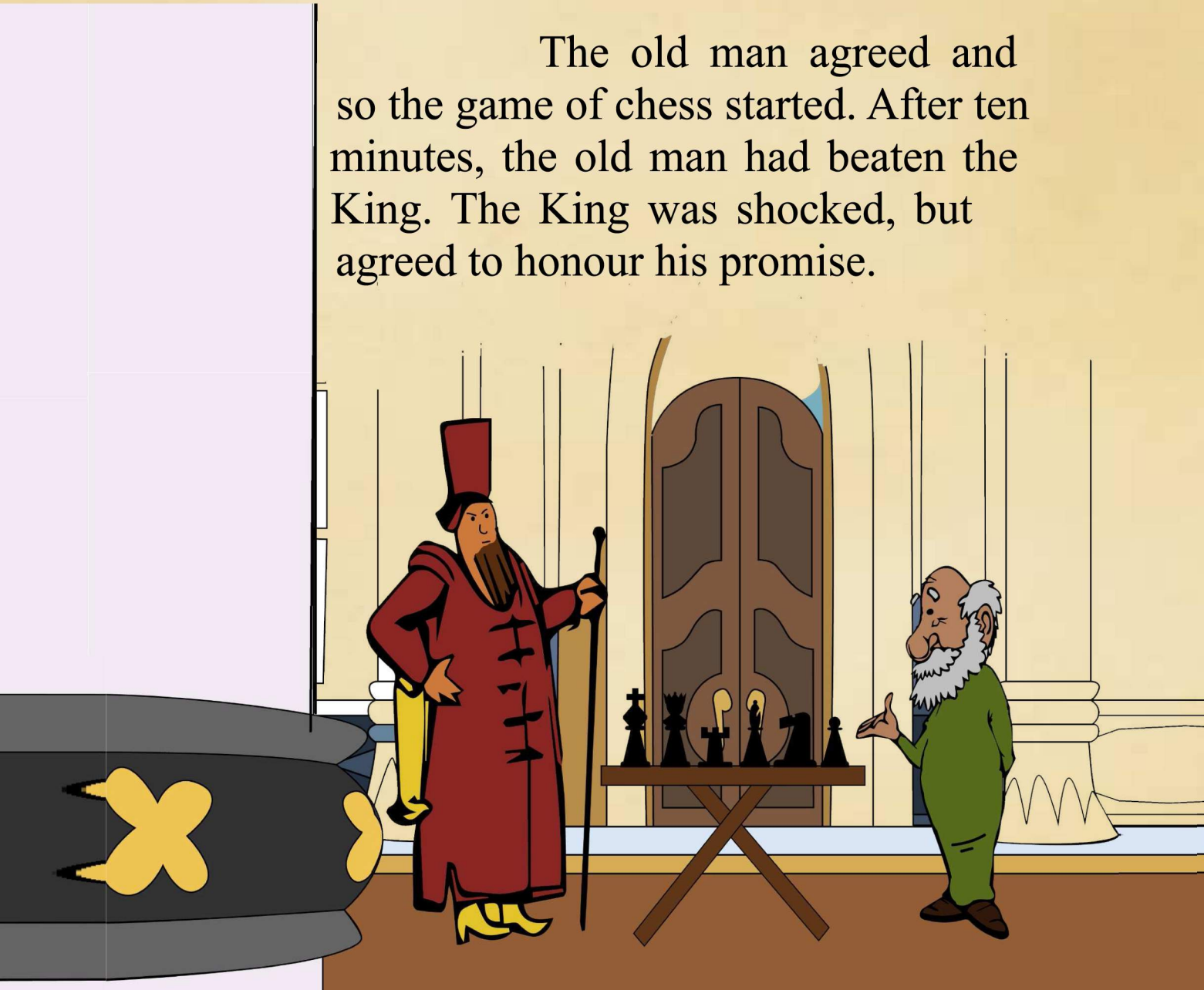
Once upon a time in India, there lived a poor old man. This man had a very small house and little money for food. To pass the days, the poor man would play chess and over time got very good at the game.

At the same time there lived a rich king. This king loved to play chess also and thought he was the best chess player in the land. The King would invite some of the best chess players in India to his palace, just so he could beat them at his favourite game.

One day, word spread to the King that there was a poor old man who was an excellent chess player. “Bring this man to me straight away, so that I may beat him and show him who the greatest chess player in all of India is” said the King. So the old man was brought to the King's palace.

Upon seeing the poor old man, the King started laughing. “This is the man who people say might beat me at chess? He is nothing but a poor, old cripple” said the King. The King was so sure that he would beat the old man, that he said, “Old man, if you beat me, I promise to give you anything you want”.

The old man agreed and so the game of chess started. After ten minutes, the old man had beaten the King. The King was shocked, but agreed to honour his promise.



He said to the old man, “You are a great chess player and I am an honest king. Whatever you ask for will be given to you”.

Now the old man was very wise and was very good at maths. He said to the King, “All I want is a single grain of rice on the first square of the chess board and double it on every consecutive square”.

The King was shocked that the old man wished for such a simple and small request and so the King agreed. “Bring in a bag of rice”, shouted the King. He then put one grain of rice on the first square of the chess board, two grains on the second square, four on the third square, eight on the fourth square and so on.

As the King continued putting the rice on each square of the chessboard, he realised that he would not have enough rice in one bag to complete the request of the old man.

So the King sent for another bag of rice. However, that bag quickly ran out also. So he sent for 100 bags of rice. But very quickly they ran out too. At this point the old man said to the King, “Your highness, if it is easier, you may give me the rice over time and deliver it to my house”. The King agreed.

When the old man left the palace, the King got a mathematician to work out how many grains of rice he would have to give the old man. The mathematician told the King that he would have to put 18,000,000,000,000,000,000 grains of rice on the 64th square of the chessboard. This amounted to more rice than there was in the whole world.



So the King had to deliver rice to the old man every day, and so the man was never hungry again.



~ *The Millionaire* ~

In the 17th century, a clever man called Pierre de Fermat came up with a maths idea. This idea was known as 'Fermat's Last Theorem'. The problem with this theorem was that it was difficult to prove. Over the years, many geniuses tried to prove the theorem but they all failed.

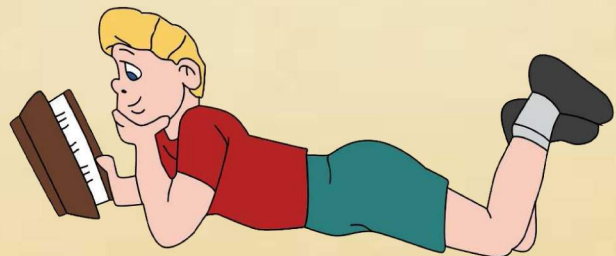
Years later, a rich man called Paul Wolfskehl was very sad and about to kill himself at midnight.



Hours before midnight, he started reading a book about the mysterious theorem that could not be proved. Paul believed that he could prove the theorem and spent hours trying. After a while, Paul looked at the clock and saw that midnight had passed. He still had not proved the theorem, but he realised that doing maths problems changed him from being a sad man to being a happy man.

Paul decided not to kill himself, but instead offered two million dollars to anyone who succeeded in proving the theorem. Six hundred and twenty one people sent in proofs in the hope of winning the money, but all failed.

Then in 1963, a ten year old boy called Andrew saw the unsolved theorem. The boy got so interested in the maths problem, that he dedicated his life trying to solve it.



For thirty four years, Andrew tried and tried. But every time he thought he had managed to prove it, he stumbled upon a problem and failed. Poor Andrew was almost at the point of giving up.

Then in 1997, after years of hard work, Andrew proved the theorem. The lucky boy, who was now an elderly man, received the prize money, became rich and lived happily ever after.



~ Évariste the Fighter ~

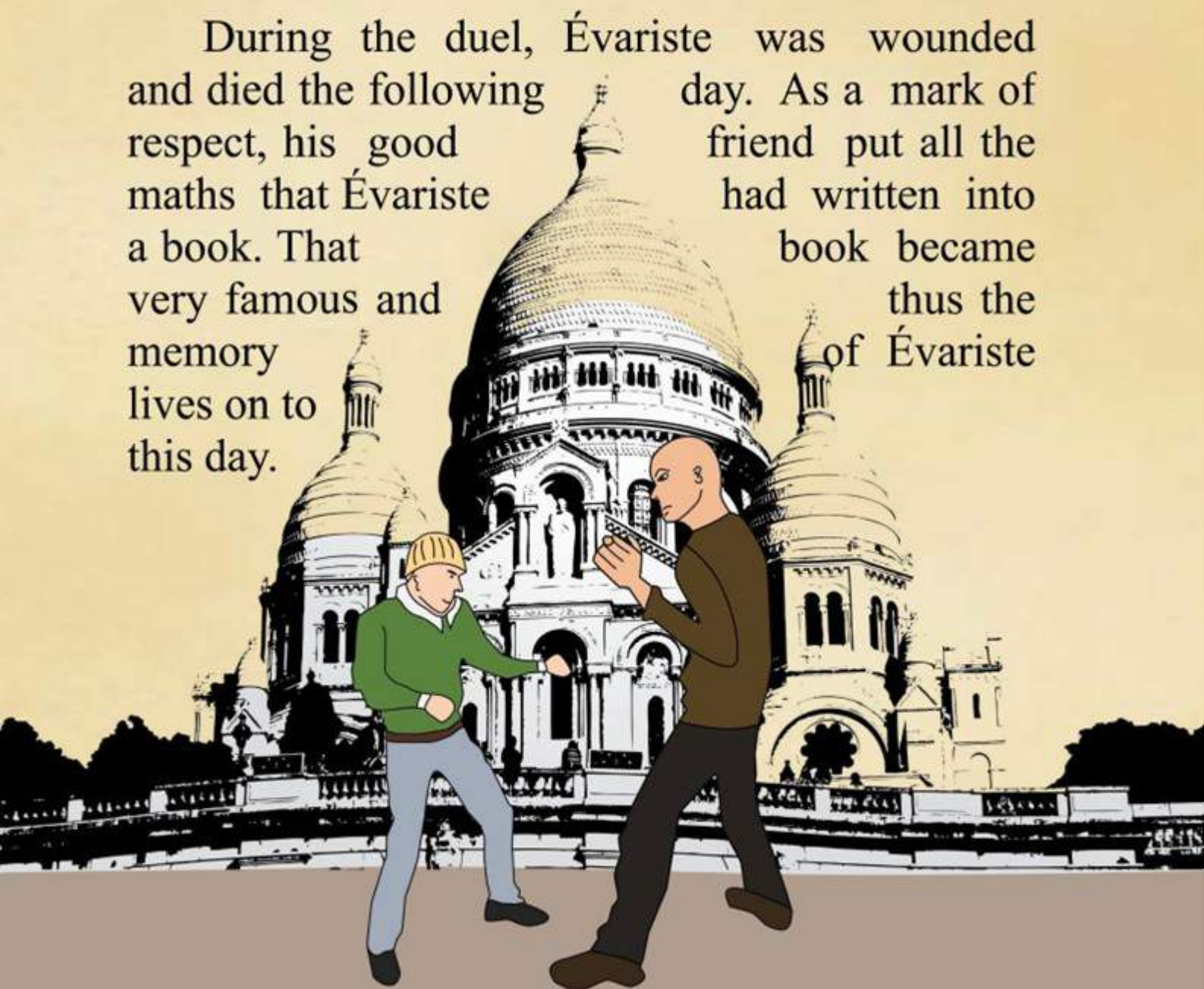
In France, during the 19th century, there lived a boy called Évariste Galois. Évariste was a maths genius, but he did not take much interest in his school work.

One day Évariste was naughty in school and he got kicked out. He then decided to join the National Guard, who were a group of soldiers that protected France. Around this time, there was lots of political fighting in France, which forced the king to flee. The new king came and outlawed the National Guard. But Évariste stupidly continued to wear the guard uniform and was thrown in jail.

When he was released from jail, poor Évariste did something very silly again. He proposed a toast to the king with a dagger in his hand, which was against the law, and he was sent back to jail.

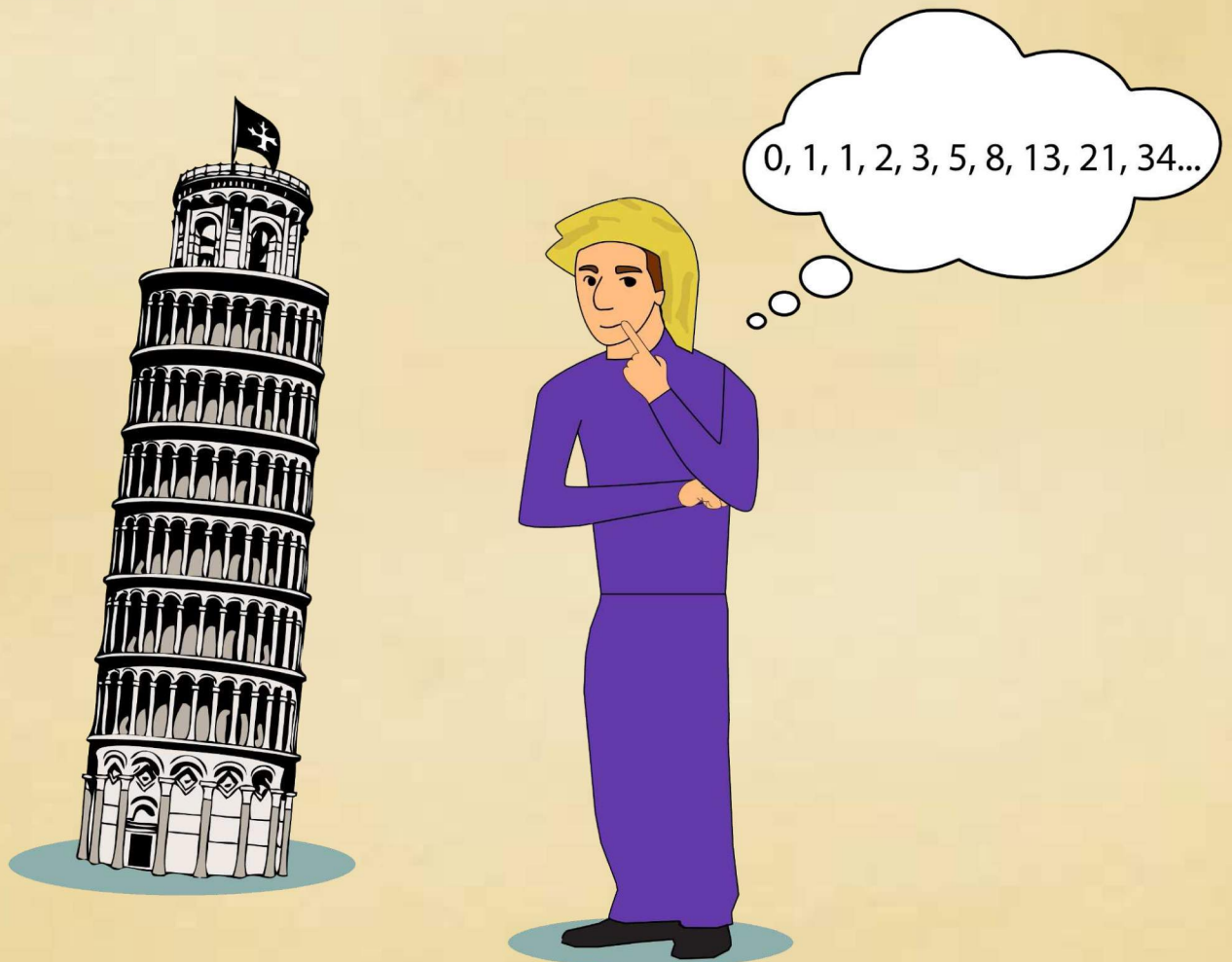
After he was released from jail for the second time, Évariste got into a fight with a man over a girl. Both men proposed to have a duel. Seeing that the man was bigger than him, Évariste thought it would be a good idea to write down all his maths notes in case he died in the fight.

During the duel, Évariste was wounded and died the following day. As a mark of respect, his good friend put all the maths that Évariste had written into a book. That book became very famous and his memory lives on to this day.



~ The Golden Ratio ~

In the 13th century, there lived a man named Leonardo de Piza. Everybody called him Fibonacci. Fibonacci discovered a very interesting group of numbers. This group of numbers became known as 'The Fibonacci Sequence'. The sequence works by adding the two preceding numbers to get the next number.

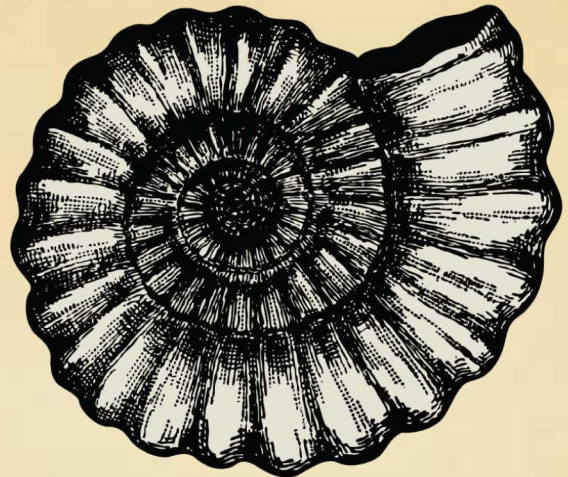
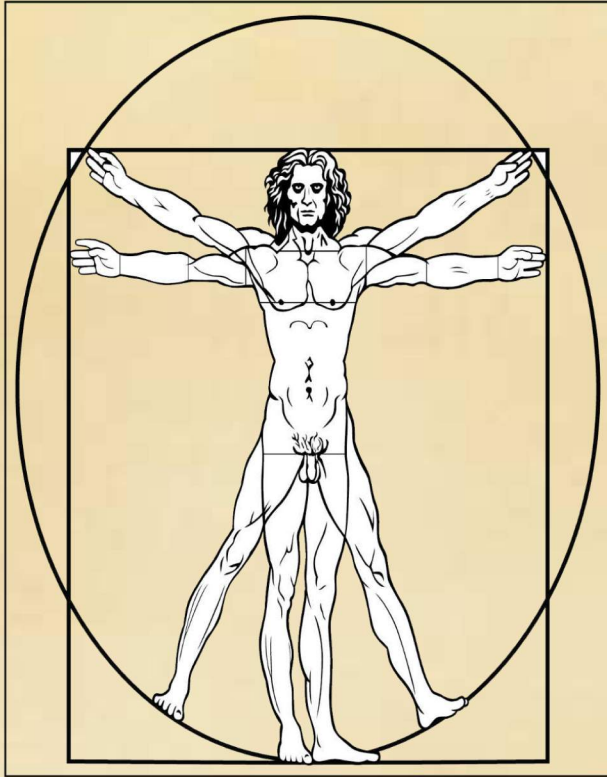


What makes this series so magical, is that the further it continues, the closer the ratio of the two numbers next to each other gets to the mysterious 'Golden Ratio'. The golden ratio is 1.6180..... (It is an irrational number so it goes on forever and ever).

This golden ratio magically appears all over the world and the clever Fibonacci knew this. He saw that it appeared in the way petals were arranged on a flower, on the spiral of a snails shell, and even in our bodies. Great artists like Leonardo da Vinci included this golden ratio in his paintings, and many famous buildings around the world have the golden ratio in their design.

Amazingly, the closer an object's shape is to the golden ratio, the more beautiful we tend to think the object is.

Wow!!!! Maths really is all around us.



~ *The Eye of Horus* ~

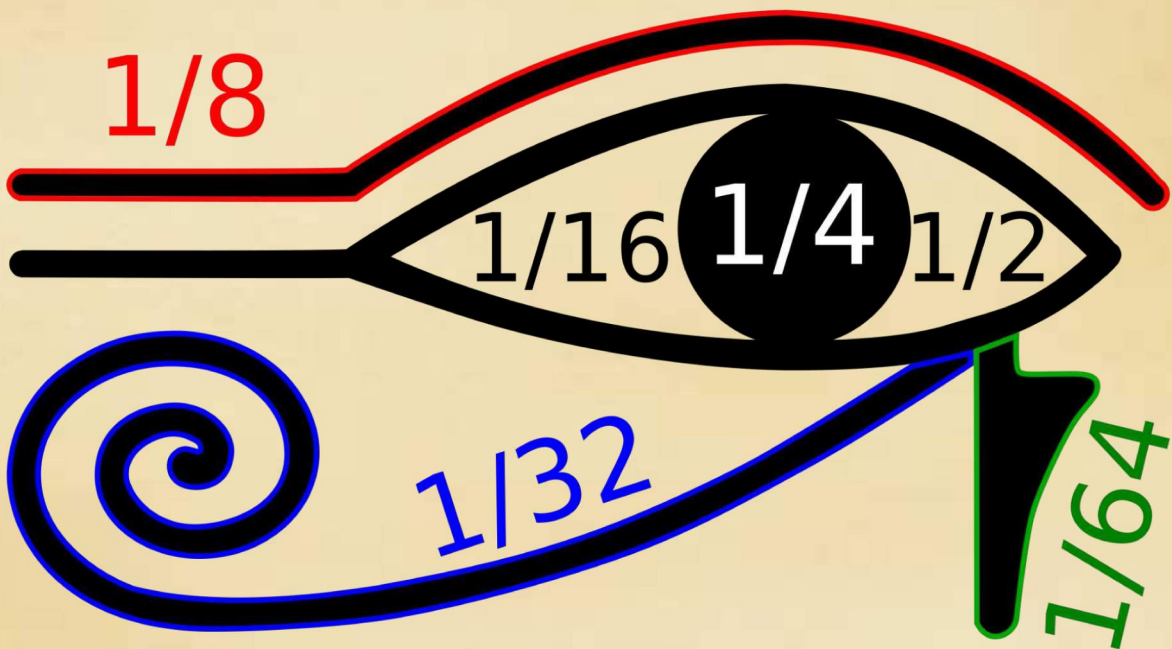
Many thousands of years ago, there lived a god of the sun, called Horus. Horus had a friend called Thoth, who was god of the moon and an enemy called Set, who was a bad god who aimed to take over Egypt.

Horus and Set had many battles.

In one of these battles, Set tore out Horus' eye, ripped it up and scattered it across the lands of Egypt.



Horus' friend, Thoth, travelled around Egypt collecting pieces of the eye to restore them for Horus. He found $\frac{1}{2}$ of the eye in north Egypt, $\frac{1}{4}$ of the eye in the south, $\frac{1}{8}$ of the eye in the west, $\frac{1}{16}$ of the eye in the east, $\frac{1}{32}$ of the eye in the river Nile and $\frac{1}{64}$ of the eye in the city of Cairo.



Thoth put the eye back together for Horus. But did he find the entire eye, or was there still some of Horus' eye missing? Add up all of the fractions of the eye together and see.

~ I Don't Want Money! ~

Since 1904, there existed a mysterious problem in maths known as the 'Poincaré Conjecture'. This problem had baffled even the greatest mathematicians for almost one hundred years because nobody could solve it. Every time someone got close to solving it, they simply failed.

Then in 2002, a strange man called Grigori Perelman from Russia, succeeded in solving it. Mathematicians were so excited and happy that they offered to give Grigori one million dollars.

Grigori was a poor man, so one million dollars would have changed his life. However, Grigori said, "I am not interested in fame or money. I do not want to be on display like an animal in a zoo" and refused to take the reward.

What a strange man!!

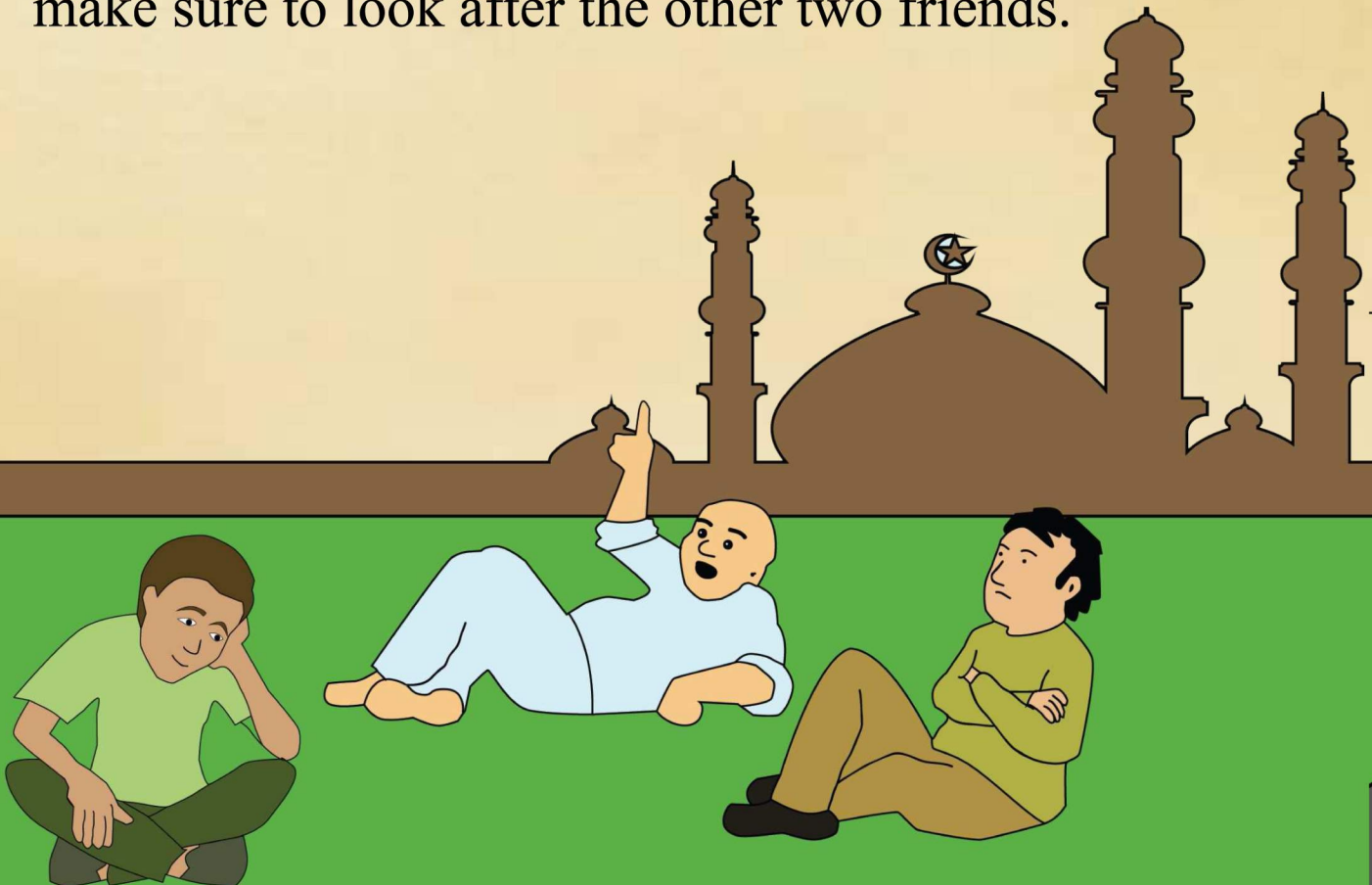
**I don't want money
I do not want to be
on display like an
animal in a zoo**



~ *The Assassin* ~

Almost one thousand years ago in Persia, there lived a boy called Hassan i Sabbah. Hassan loved maths and would often spend all day trying to solve maths problems.

One day, Hassan was talking with his two friends, Nizam and Omar, in a field. The three friends agreed that if any one of them was to become rich when they were older, they would make sure to look after the other two friends.



As the years passed, Nizam became rich. Hassan went to his friend and reminded him of the pact they had made when they were young boys. So Nizam gave Hassan a very good job working for the king.

However, Hassan hated to work. All he wanted to do was maths all day. He especially loved working on geometry problems.

One day, Hassan decided he had enough of working. So he killed Nizam, who was good enough to give him the job, and set up a group of men that would kill people in return for money.



This group of people were known as the 'Hashashins'. Hassan would persuade people to join his band of Hashashins by promising them that if they joined, he would ensure that when they died they would go to live in paradise. He did this by giving them a magic potion to make them fall into a trance. Then, while they were in this trance, he would bring them to a gorgeous place with trees full of fruit, beautiful women and exotic birds.



When the magic potion would wear off, Hassan would tell the person that they had been in paradise and that if they joined the Hashashins, they would return to this place when they died.

In this way, Hassan built an army of dangerous Hashashins that terrorised the people of Persia for many years. Even to this day, we still use a form of the word Hashashin, to describe a person who kills for money. The word we use today is 'Assassin'. There is even a computer game based on the Hashashins, called 'Assassins Creed'.

As for Hassan's friend Omar. He went on to become one of the greatest mathematicians in the world.

Maybe Hassan should have concentrated more on maths!



~ *Archimedes and His Bath* ~

Over 2200 years ago, on the island of Sicily, there lived King Hieron. King Hieron loved jewellery and especially gold jewellery. The King wanted a crown made especially for him and gave a blacksmith a bar of gold to make it.

When the King received the specially made crown, he suspected that the blacksmith had stolen some of the gold for himself, before making the crown.

However, the only way the King could think of finding out if he had been cheated by the blacksmith, was to melt the gold back into the shape of the gold bar and see if there was any gold missing. But the King did not want to do this because it would mean having to destroy the crown.



So the King sent for Archimedes' help, who was the cleverest man in the land.



It puzzled Archimedes as to how he was going to find out if the King had been cheated, without melting the crown.

One day, when Archimedes was washing himself, he fully filled a bath with water. When Archimedes got into the bath, some water spilled out onto the floor. Archimedes immediately knew he had found the answer he was looking for. He jumped out and ran down the street, with no clothes on, shouting “Eureka! Eureka!”, which means “I’ve got it”.



Archimedes realised that if he fully filled a container with water, and then dropped an object into it. The amount of water that spilled out of the container, would be the same size as the object that was put into it. So he did this with the King's crown.

He then measured the amount of water that spilled from the container and compared it to the amount of gold the King gave to the blacksmith to make the crown. If the King had not been cheated, then the water which spilled out, would measure the same amount as the bar of gold.

However, when Archimedes measured the amount of water that spilled from the container, he saw that it was less than the amount of gold that the King had given to the blacksmith. Archimedes went and told the king that he had been cheated. Nobody knows what became of the cheating blacksmith, but he was never heard from again.

~ Superstition Killed the Mathematician ~

In the 1800s, there lived a clever man called George Boole. George was born in England and lived there until he was 34 years of age. He then moved to Ireland and became Professor of Maths in University College Cork.

Professor Boole was very interested in algebra, and made some very important discoveries in this area of maths. As well as being a great mathematician, Professor Boole was also a very energetic man. He used to walk two miles to work every day, teach the students and then walk two miles back to his house.

One very wet day, Professor Boole made his usual walk to work. He then taught for hours in his soaking wet clothes. Because of this, Professor Boole developed a fever and had to stay in bed.

A cartoon illustration depicting a man slipping on a banana peel in the rain. The man, wearing a black suit, a red and white striped tie, and brown trousers, is shown in mid-air, having lost his footing. He has a surprised expression on his face. A banana peel is on the ground near his feet. The scene is set in front of a large, ornate building with a central tower and two side wings, all in shades of orange and red. The building has several windows and a central arched entrance. A banner across the front of the building reads "University College Cork". The ground is green, and the sky is light blue with diagonal lines representing rain. The entire scene is framed by a decorative wrought-iron fence.

University College Cork

Professor Boole's wife was a superstitious woman and she believed that whatever makes you sick will also make you better. So she thought, "Being wet made him sick, so being wet will cure him".



For the next four days, Mrs. Boole poured ice-cold water on top of Professor Boole, while he lay in bed. But rather than cure him, this caused the Professor to get worse.

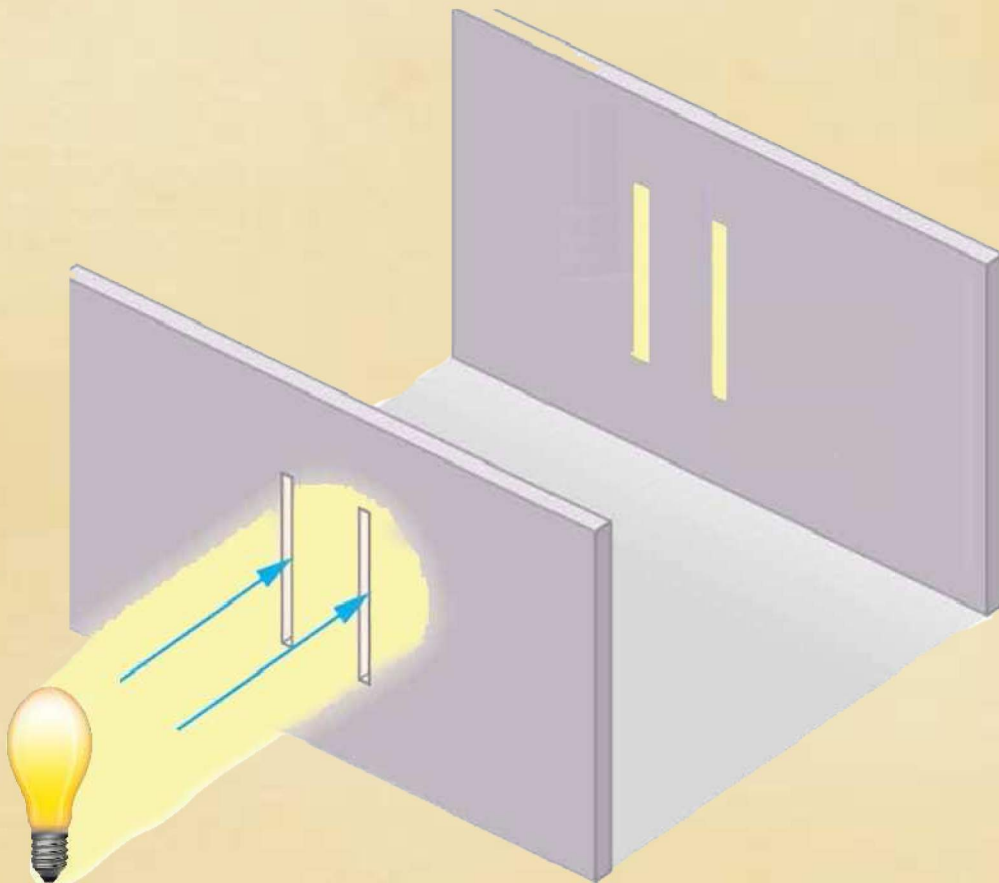
After some time, thanks to Mrs Boole and her ice-cold water, Professor Boole developed pneumonia. Sadly, because of this, the poor professor died. However, his discoveries in maths all those years ago helped develop the internet we have today.

Thank you Professor Boole!

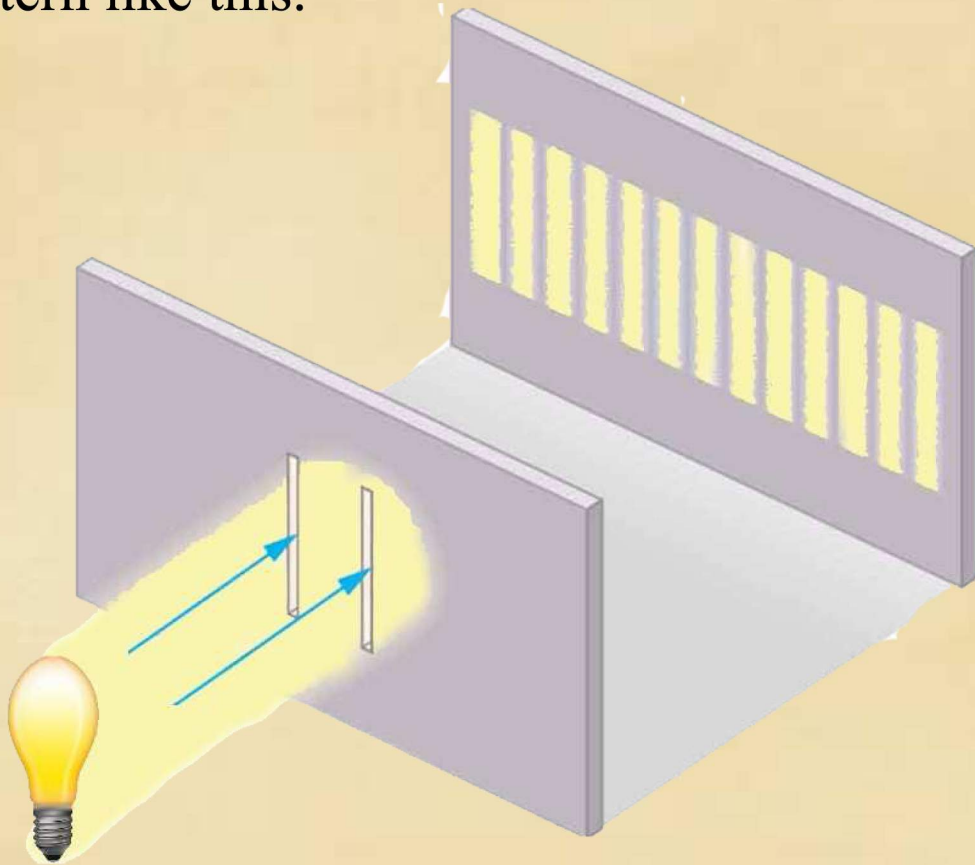


~ Is the Light Alive? ~

Many years ago, a man called Thomas Young wanted to find out whether light travelled in waves or in particles. To do this, he shone a light on a sheet of paper with two rectangular holes cut out of it. If the light travelled in particles, then the light would shine through the paper and project an image like this on the wall.

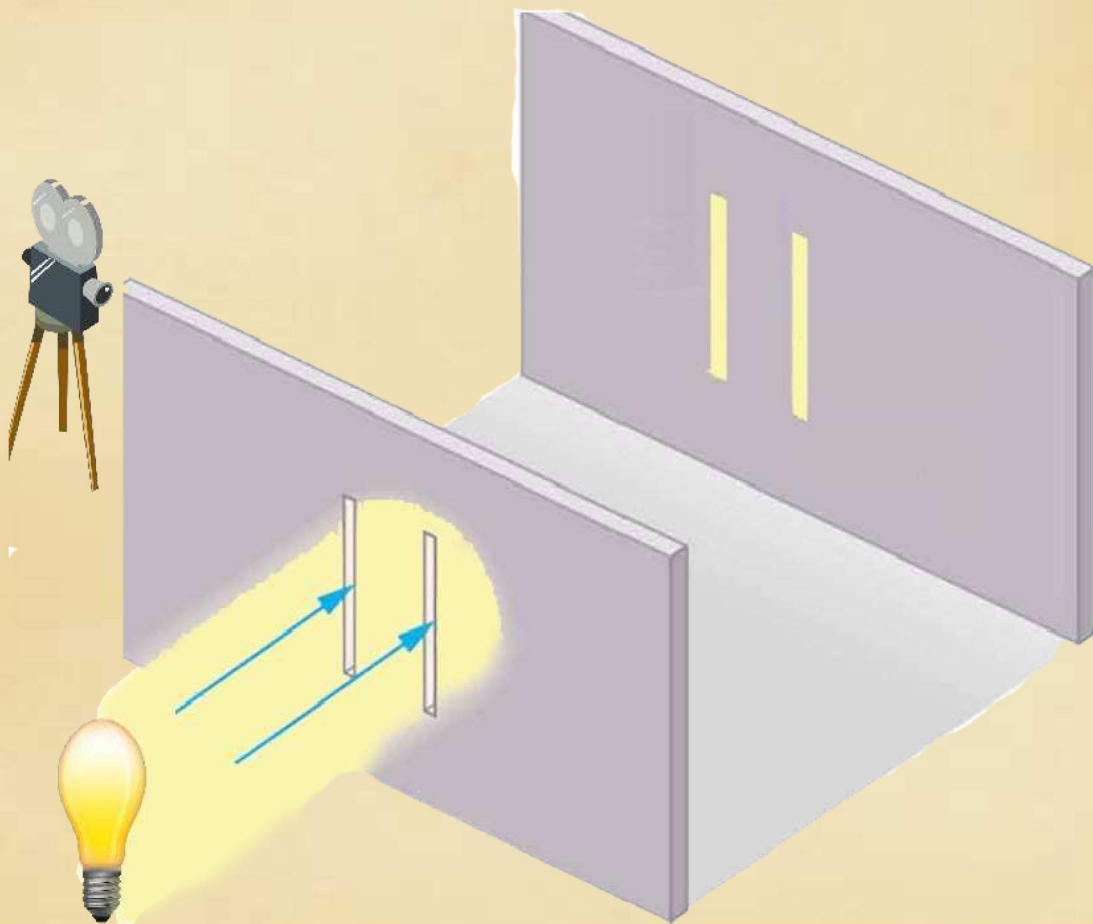


If, however, the light travelled in waves, then the image on the wall would show a wavy pattern like this.

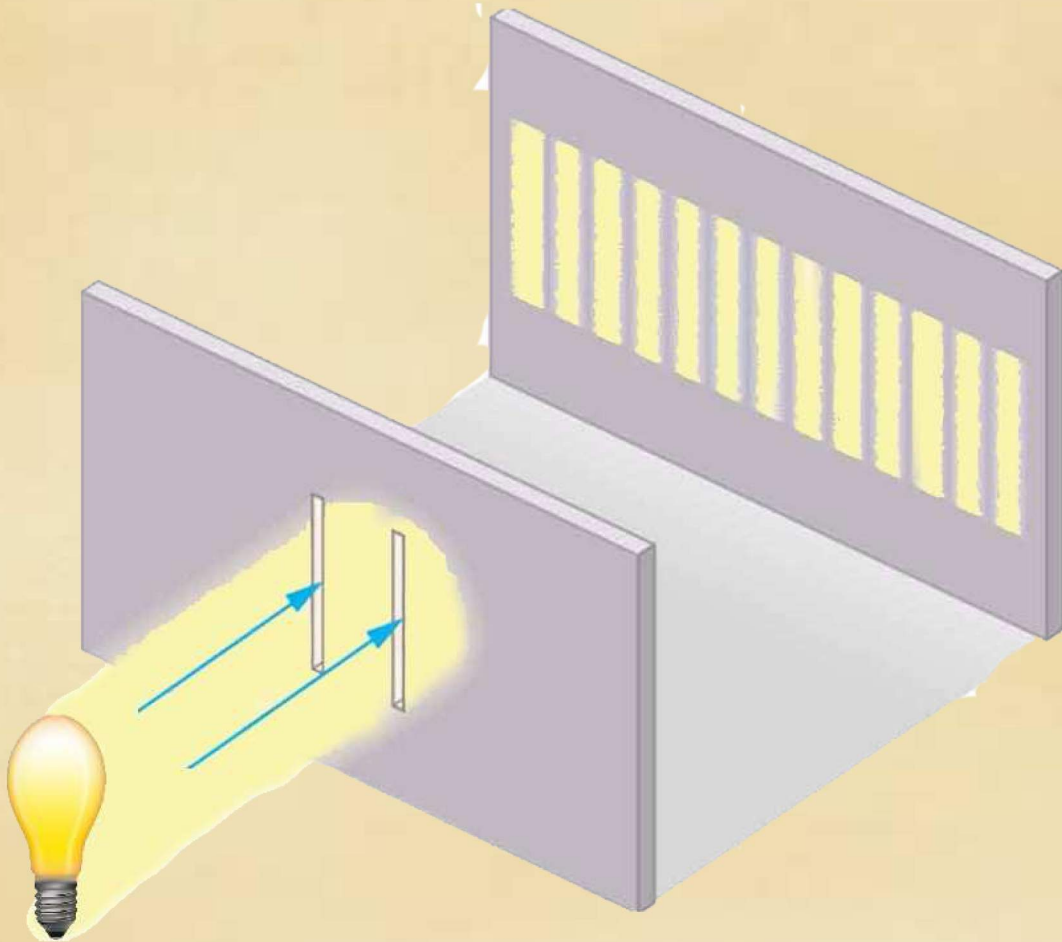


Thomas, along with most scientists, was sure the light would travel in particles and was expecting the image on the wall to show just the two strips of light. But to his surprise, it showed the wavy pattern. This made Thomas believe that light travelled in waves. However, some scientists still didn't believe him.

Years later, a scientist decided to do the experiment again. This time he set up a video camera to see what the light was doing as it passed through the holes in the paper. What happened next was amazing. When the camera was recording the light going through the rectangular holes, the shadow on the wall was like this.



But as soon as the camera was taken away, the light started to act strangely again and produced a wavy pattern.

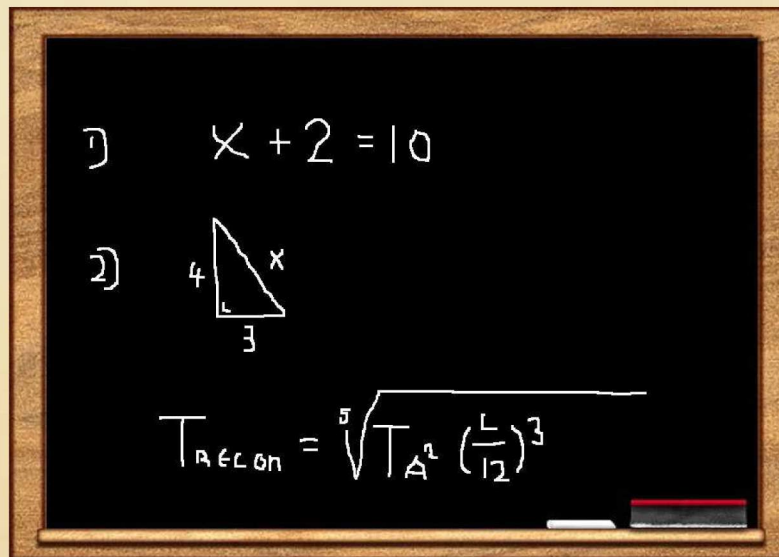


It was as if the light knew it was being watched. I wonder did it know? What do you think?

Welcome to the crazy world of maths!

~ *Benefits of Being Late* ~

In 1939, a college student called George Bernard Dantzig stayed up very late one night. The next morning, George slept through the ringing of his alarm clock and was late for his maths class. George rushed into class and saw there were three maths questions written up on the blackboard.



All the other students were busy writing, so George quickly started to write the three problems into his copy book, as he thought they had to be done for homework.

Later that night, he solved the first two problems easily but had some trouble with the third one. However, after spending some time thinking about it, he came up with an answer. George was confident that he had the first two questions correct, but he was unsure about the third one.



A week later, George's professor came and said to him. "George, do you realise what you did for the homework questions last week?"

George now started to think that maybe he hadn't got the first two questions correct after all. "No professor, what did I do wrong?" said George.

"Well George, you were only supposed to do the first two questions on the board. The last question was a maths problem that people since Einstein have been unable to solve. I wrote it up on the board because I was discussing it with the class before you arrived. Amazingly, George, you solved it!", said the professor excitedly.

George's answer to the problem was published in a book and George became famous.

All because he was late for class!

