INTRODUCTION

Mathspeak starts with an online advertisement.

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Language book needs actors

MATHSPEAK - the English of mathematics book - needs 4 young performers to teach the language of mathematics.
Mathspeak stars well known celebrities. Successful candidates will work with people such as Leonardo da Vinci, Coco Chanel and Albert Einstein.
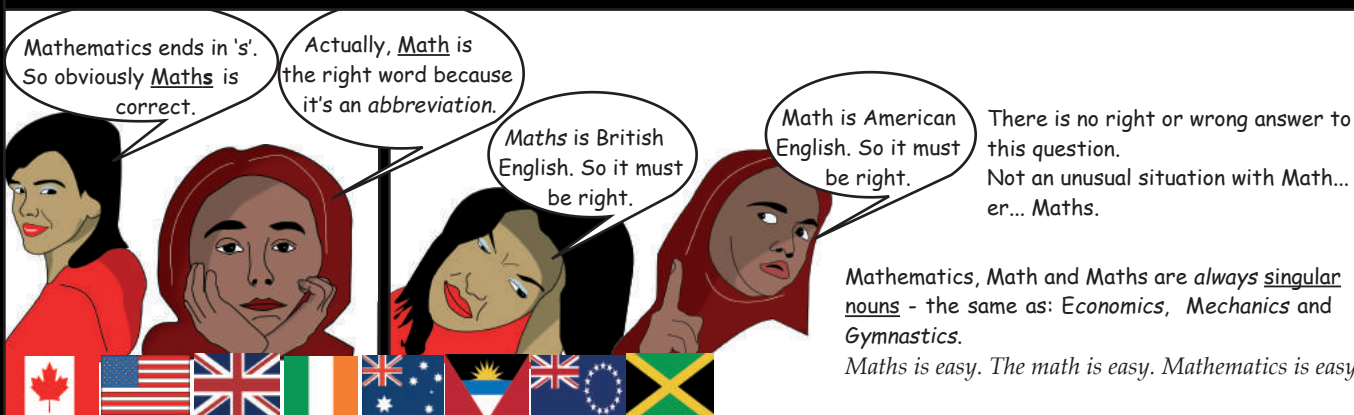
Excellent pay
Interviews in the frame below

APPLY NOW

INTERVIEW ROOM

Next please.

And the successful candidates are...

Scott

Asmara.

Tyrone

Call me Chong.

Hey - does anyone know whether to say Math or Maths?

---

*Mathematics ends in 's'. So obviously Math**s** is correct.*

Actually, Math is the right word because it's an abbreviation.

Maths is British English. So it must be right.

Math is American English. So it must be right.

There is no right or wrong answer to this question.
Not an unusual situation with Math... er... Maths.

Mathematics, Math and Maths are *always* singular nouns - the same as: *Economics, Mechanics* and *Gymnastics.*
Maths is easy. The math is easy. Mathematics is easy.

EXERCISE 1 Choose the right word to complete these sentences:

1. Mathematics **is / are** really only a game.
2. Maths **does / do** appear a lot in Mechanics and Economics.
3. Math **give / gives** me a headache.
4. I was sure that the maths **were / was** wrong.
5. These mathematical problems **are / is** not easy to do.

LESSON ONE
NUMBERS

In this lesson:
Discussion: Do you believe in numbers?
How to say numbers
Ways of saying 0
Decimal & vulgar fractions
Comparing with numbers (twice the size of...), (half as big as..)
Uses of the word 'number'
Classroom language - results of tests
Times & dates
Double, triple, four-fold etc.

Celebrity guest: **Pythagoras (570 - 495 BC)**

We don't know much about Pythagoras because he lived such a very long time ago. What we do know is that he discovered square roots, many of the properties of triangles and used mathematics to understand the universe. One of his conclusions was that the universe is in harmony because it is governed by number.

Pythagoras was a musician as well as a mathematician and discovered the ratios between musical notes and string lengths. He believed that the planets make music as they move through Space; *the Music of the Spheres.* He said that we, ordinary people, can't hear this music because it's all around us from birth.

He and his followers, the Pythagoreans, owned nothing, meditated in silence for long periods of time and were vegetarian. Pythagoras also did not eat beans. This was probably because he believed that humans and beans are made from the same stuff. Beans hold human souls, he said, and to eat them is cannibalism.

There is a legend about his death. Apparently, a spoilt young man named Kylon applied to join the Pythagoreans but they turned him down - Kylon was dull and shallow and his money could not buy membership of the group. The rejection made him want to destroy Pythagoras and his followers.

He stirred up trouble and convinced a mob of people that Pythagoras was dangerous. They set fire to the Pythagoreans' houses and went looking for Pythagoras. Pythagoras could have escaped but when he came to a field of beans he could not force himself to step on the beans - not even to save his own life. The mob caught him and murdered him.

People have often misunderstood Pythagoras

He wants to call the long side a hippopotamus.

DISCUSSION
Do you believe in the power of numbers?

The number 3 appears again and again in fairy tales, old rhymes, myths, legends and religions. Can you think of examples from *any* culture?

Here are two ...

Cerberus - the three-headed dog
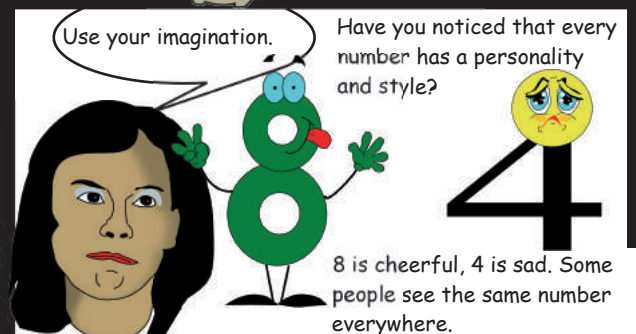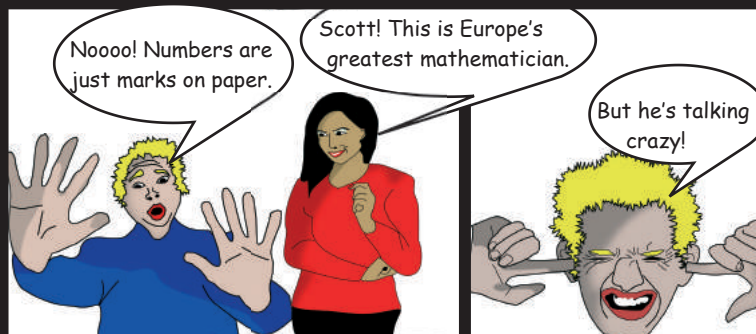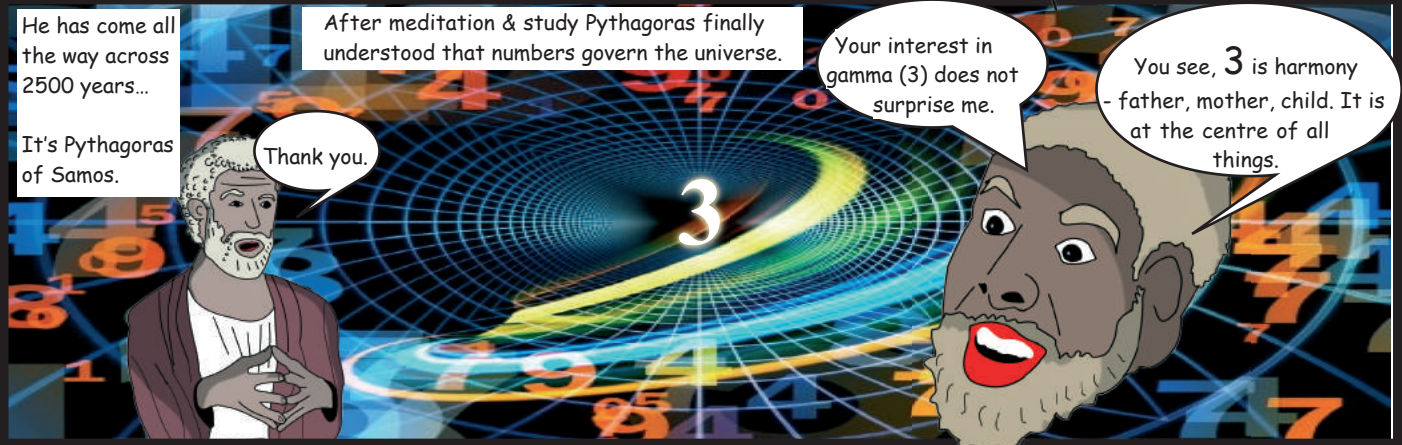
Three blind mice

Our first guest will explain why 3 is special.

He has come all the way across 2500 years…

It's Pythagoras of Samos.

After meditation & study Pythagoras finally understood that numbers govern the universe.

Thank you.

Your interest in gamma (3) does not surprise me.

You see, 3 is harmony - father, mother, child. It is at the centre of all things.

Noooo! Numbers are just marks on paper.

Scott! This is Europe's greatest mathematician.

But he's talking crazy!

Use your imagination.

Have you noticed that every number has a personality and style?

8 is cheerful, 4 is sad. Some people see the same number everywhere.

1 + 1 = 2

No, I can't agree. Numbers are tools for counting – nothing more.

So why do you always wear number seven when you play football?

It's lucky.

Exactly!

Would the Pythagoreans accept you as a member?

Do this questionnaire and find out. Compare your answers with other students.

You have to pick any number to win a prize. How do you choose?
I have a set of special numbers I always use for things like this. (1 point)
It doesn't matter. All numbers are the same to me. (0 points)
The first number to come into my head is always the same one. (2 points)

There are four identical taxis. Their numbers are: 4, 7, 8 and 13. Does it matter which taxi you get in?
I will take any of them, but, there is one I prefer. (1 point)
The first one in the line will do – why not? (0 points)
There is at least one I would definitely *not* choose. (2 points)

On the 8th of October, you look up at a clock and see that the time is 08.08. At that moment the clock falls on your head and you spill the drink you're carrying down your best clothes. How do you react?
Aha! That proves number eight is unlucky. (1 point)
I wish I had fixed that clock. (0 points)
How strange! I would expect this to happen at 04.04 on the 4th of April. (2 points)

What do you think of the number 666?
A cool number which I use as a password. (1 point)
What's there to think? (0 points)
It's the number of the devil. I don't want to say or even think it. (2 points)

Scores

6-8 You have strong beliefs about numbers and probably think that events in your life are not always under your control. The Pythagoreans would welcome you if you want to learn the meaning of life.

1-5 You are open to ideas but the Pythagoreans think you have a lot to learn about the universe. They reject you in this life time. Try again if you are reborn in human form.

0 You are modern and free from superstition. The Pythagoreans don't want you. They probably think you are cynical and not of their time.

3

BIG NUMBERS

Rule 1. In British English use *and* before compound numbers (between 21-99) when they are part of a larger number. Example: 1,053 is *one thousand and fifty-three*. American English doesn't use this *and*. In American English 1,053 is *one thousand fifty-three*.

Rule 2. You can sometimes use *a* instead of *one* (pronounced *uh*). Example: 150 can be either *a hundred and fifty* or *one hundred and fifty*. But in big numbers use *one*. Example: 2,150 is *two thousand one hundred and fifty*, *not two thousand a hundred and fifty*.

Rule 3. Speak all number labels as singular. Example: 10,400 is *ten thousand four hundred*, *not ten thousands four hundreds*.

Rule 4. You can say three and four figure numbers in hundreds instead of thousands. Example: 1500 can be *fifteen hundred*.

HOW TO SAY NUMBERS

Which of these is:
a four figure **number**
an eight-sided **figure**
a single **digit**

8   8,888   ⬡
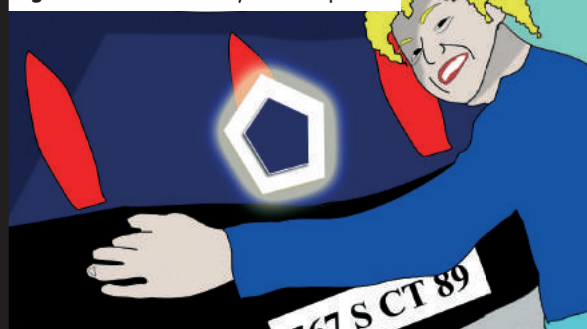
Check your answers as you read.

Chong's superstitious. The logo on her car is a **single digit figure-of-eight**.

She thinks eight is a lucky **numeral**. Stupid, huh?

But I'm not jealous. So what if she has a car?

The logo on Scott's car is a **five-sided figure**. To him it's a symbol of power

I like your car.

Thanks. I call her *the BEAST*.

WHIRR
CLANG
POP
BANG

The BEAST SPECIFICATIONS

Acceleration: *from nought to sixty in thirty seconds.*

Top speed: *one hundred and two kilometres per hour.*

Engine size: *two thousand five hundred cc.*

Chong's car is **eight forty-five cc.** That's only a **three digit number**.

Yeah- and the Beast's got **six fifty** horse-power under her bonnet.

Don't you mean donkey-power?

Have you seen the **digits** on the number plate?

Wow! **Consecutive!**

Are you really impressed by **a few figures** or are you just pretending?

COMPREHENSION

Choose the best answers:

1. What is the logo on Chong's car?
a. An eight-sided figure
b. An eight-figure number
c. A single numeral

2. Which of these is true about the Beast?
a. She can accelerate to 30 in second gear.
b. She cannot go faster than 150 kph.
c. She has a 1,500 cc engine.
d. She has a 6 cylinder, 50 HP engine

3. How big is Chong's car?
a. A lot smaller than the Beast
b. A little smaller than the Beast
c. The same size as the Beast

4. Which of these is true about the Beast's number (licence) plate?
a. All the digits are the same
b. The numbers are in order
c. There is no order to the numerals

Speak these numbers aloud to a partner:

Student A	Student B
1. 22,022	1. 15,299
2. 10 kpm	2. 2,222
3. 348	3. 709
4. 1,000,001	4. 619

Find the error in each of these numbers.
1. Ten thousands and sixty three
2. Four thousand and five hundred
3. One thousand and twenty and three
4. Twenty-and-two

True or false?
1. 123 is a *three-sided figure*.
2. A square is a *figure four*.
3. ⬢ is a *six-sided figure*.
4. A 'figure' can be a shape *or* a number.
5. *Digits* numerals and *figures* can be the same things.
6. Three hundred and thirty-three is a three digit number.

HOW TO SAY NOTHING

How many ways can you say '0' in English? Make a list then read the dialogue and check for any that are new to you.

The word you use depends on the context. Take sport for example...

Asmara's team has **no** points this season. So it is important to win this match...

The kick off is at at **oh**-nine hundred.

At half time they are drawing nil-**all**.

The other team scores early in the second half. That puts them one-nil up.

Chong has a terrible match.

She wins **no** points and goes down three games to **love**.

The match ends *eight-nil* to the other team.

Bad news for Scott

He is out **for a duck**.

And Tyrone..?

VISITORS 0 0 0 0 0 0
HOME 0 0 0 0 0 0

Only **goose eggs** on the scoreboard

'Head Coach Tyrone'. I like the sound of that

SPORTS COACH

None of them is any good. Talent: **zero**.

Each gets **nought out of ten** for performance.
On a scale of nought to ten for effort they score **half marks**.

We are all losers.

Each with a **zero** rating.

Ach! It means **zip**.

All we need is a good coach.

Please! I know **diddly-squat** about coaching.

TYRONE!

But when Tyrone realises that he won't have to play, in **no** time he changes his mind.

But can he turn three **zeroes** into heroes?

COMPREHENSION

1. When did Asmara's match start?
a. in the evening
b. early
c. mid-day

2. Which of these statements is true about Asmara's team?
a. They were losing at half time but finally got a draw.
b. They did not score any goals.
c. They won by eight goals.

3. What happened to Chong?
a. She lost three games.
b. She fell down.
c. She enjoyed the match.

4. What do we know about Scott and Tyrone?
a. They are bird lovers.
b. They failed to score.
c. Both their teams lost.

5. How many points do they each get for effort?
a. five
b. none
c. ½

6. How much does Tyrone know about coaching?
a. Everything
b. Nothing
c. A little

Complete the sentences with words from the box.

1. I have absolutely _____money.
2. I have absolutely _____.
3. The flight is at _____-eight-thirty.
4. The match was a draw: _____- all.
5. Three - two - one - _____.
6. _____of my answers were right.
7. _____out of ten is a terrible result.

oh	nil	no
zero		none
nought		nothing

Read these sentences aloud to a partner.

Student A
1. The 07:05 bus is leaving.
2. 0 x 1.09.
3. There's 0 left.
4. Dial 1-5-0-0-2.
5. It's 0°.
6. The result was 2-0.
7. There is 0 in this box.

Student B
1. We leave at 08:00.
2. I scored 0/20 for the test.
3. I know 0 about it.
4. Money? I've got 0.
5. The ETA of flight 105 is 09.00.
6. .00001
7. Username is: 600TX430

THE WORD 'NUMBER'

The word *'number'* is used with six different meanings in the next two pages. Read the dialogues and find where it means:

1. (verb) To include. Example: *We number Pythagoras among the world's greatest mathematicians.*
2. (verb) To give a number to or put a number on. Example: *She numbers the pages of her script.*
3. To add up to a total. Example: *The people in the room number about fifty.*
4. A song or an act in a large performance. Example: *Our next number tonight is a magician.*
5. Several (no specified amount). Example: *There are a number of problems.*
6. Limited (numbered). Example: *Pythagoras is finished. His days are numbered.*

A NUMBER OF THINGS TO DO

It's one minute before the start of the sketch and Scott has **a lot** on his mind...

Chong, can I have your **number**?

Why?

We have **a zillion** things in common.

Sorry, no. I have **umpteen** things to do.

For example: her script is mixed up. She has **to number** the pages.

Huh! **Countless** boys want her number.

I **number** myself among your friends.

We've only just met.

That's why I need your number.

Oh alright!

That's not a telephone number! It's **a series of random digits** that number 11.

982409 00126

Don't count them. You have to **work out** my number in another way...

Cross out the second number and **every alternate digit.**

...er...ah...oh...mmm...er

Right, so I cross out **every other number...** 982409 00126

Then arrange the **remaining numerals** in **descending order of size.**

The numbers **remaining** are... 920016

Hurry up Scott, you have to introduce the band on the next page.

Alright, alright. I'm coming. I just have to **figure** this **out.**

Her number is **double zero-one-two-six-nine.** But I'm saying zip.

COMPREHENSION

1. How many interests does Scott say he shares with Chong?
A few
None
Many

2. Why doesn't Chong give Scott her phone number immediately?
She has nothing to say.
She has forgotten it.
She is busy.

3. What's wrong with Chong's script?
Pages are missing.
The pages have no numbers on.
There are too many.

4. According to Asmara, how many boys want Chong's phone number?
Some
One or two
A lot

4. What does Scott claim?
To be Chong's friend
To know how many friends Chong has
To know some of Chong's friends.

5. What does Scott think of the number Chong gives him?
It's meaningless
It's very long
It's wrong

5. Which numbers does he cross out?
Every second number
Every number two
Two of them

6. What does Scott do with the crossed out numbers?
Nothing
Arranges them
Remainders them

7. How does Asmara arrange the digits?
Highest first
In no order
Increasing in size

Read the dialogue again and find words that mean 'large amount'.

Which of the following do *not* mean *a lot*?
zillion
umpteen
random
countless
remaining

numerous - a large amount. Example: There are <u>numerous</u> problems, I don't know where to start. You <u>can't</u> use *numerous* with uncountable nouns (water / money / advice etc.)
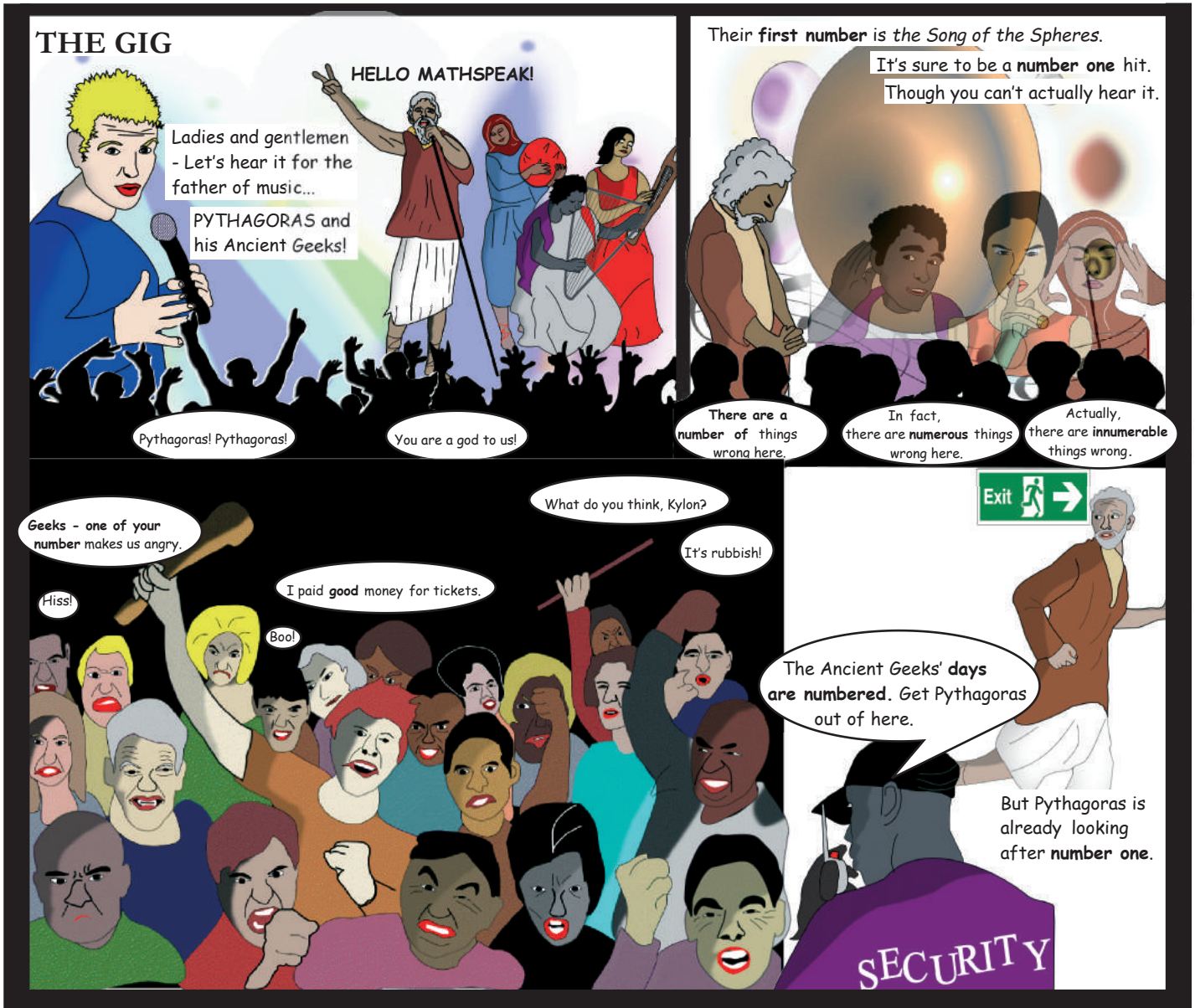
innumerable - such a large amount that the things can't be counted. Example: There are <u>innumerable</u> fish in the sea.

number one - 1. Highest / best. Example: *He is the world's number one player.* 2. Your own interests. Example: *she always takes care of number one first.*

alternate and every other - every second one. Example: *I work on <u>alternate</u> days; Monday, Wednesday and Friday.*

order (verb / noun) arrange in a certain way. Example: Put the papers in their correct <u>order</u>. <u>Descending order</u> is high to low. <u>Ascending order</u> is low to high.

good money - a lot of money. Example: *The job pays <u>good money</u>.*

Put words from the box into the correct spaces in the sentences.

| a number | the number | numerous | number |
| numbered | to number | innumerable | |

1. It is impossible _____ the stars. We just don't know how many there are.

2. The stars are _____. There are so many

3. _____ of people say they can hear the music of the spheres

4. 666 (six hundred sixty-six) is _____ after 665 and before 667.

5. My car is very old. It's days are _____.

6. There are lots of things wrong with it - too _____to mention.

7. I want to join your group and become one of your _____.

Match the words in the left column with definitions.

every other	every second one
good money	no particular order
umpteen	with a line through
number one	left over
random	many
crossed out	solve
work out	your self
remaining	expensive

COMPARING NUMBERS

Rule 1. To compare sizes of numbers, use a comparative adjective (bigger, greater, smaller, less, fewer, more…) + *than*. Example: *ten is greater than five*.

Rule 2. To say *how much* greater / smaller etc. use a *number + times + than*. Example: *fifteen is three times bigger than five*. Or use a number + times + as + adjective + as. Example: *fifteen is three times as big as five*. For fractions use fraction + the size of+ number. Example: *three is one third the size of nine*.

Rule 3. To compare a test score with a possible total use number + out of + number. Example: *three out of ten (3/10)*.

FINDING x — Part one

COMPREHENSION

1. Which of these statements is true?
1. Scott took several tests
2. Scott took only one test.
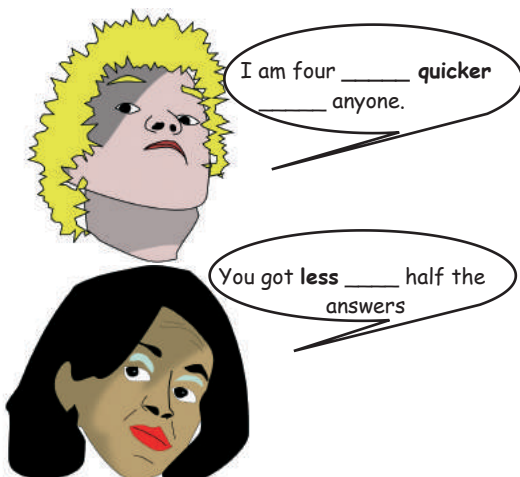3. Scott took the same test several times.

2. Which is Scott's number?
$^4/_5$
$4^1/_5$
5555

COMPARISONS

Answer these questions quickly using expressions in the dialogue
1. What is the **pass mark** of the secret agents' exams?
2. **How** good a driver is Scott?
3. **How** dangerous is Scott?
4. **How did he do** in the intelligence test?
5. **Where** did Scott **come** in the intelligence test?

Complete the speech bubbles

I am four _____ **quicker** _____ anyone.

No-one is even half __ good ____me.

I have more ____twice the average strength

You got **less** ____ half the answers

You cause twice ____ **many** problems __ anyone.

And you are ten _____ **more** annoying _____ other agents.
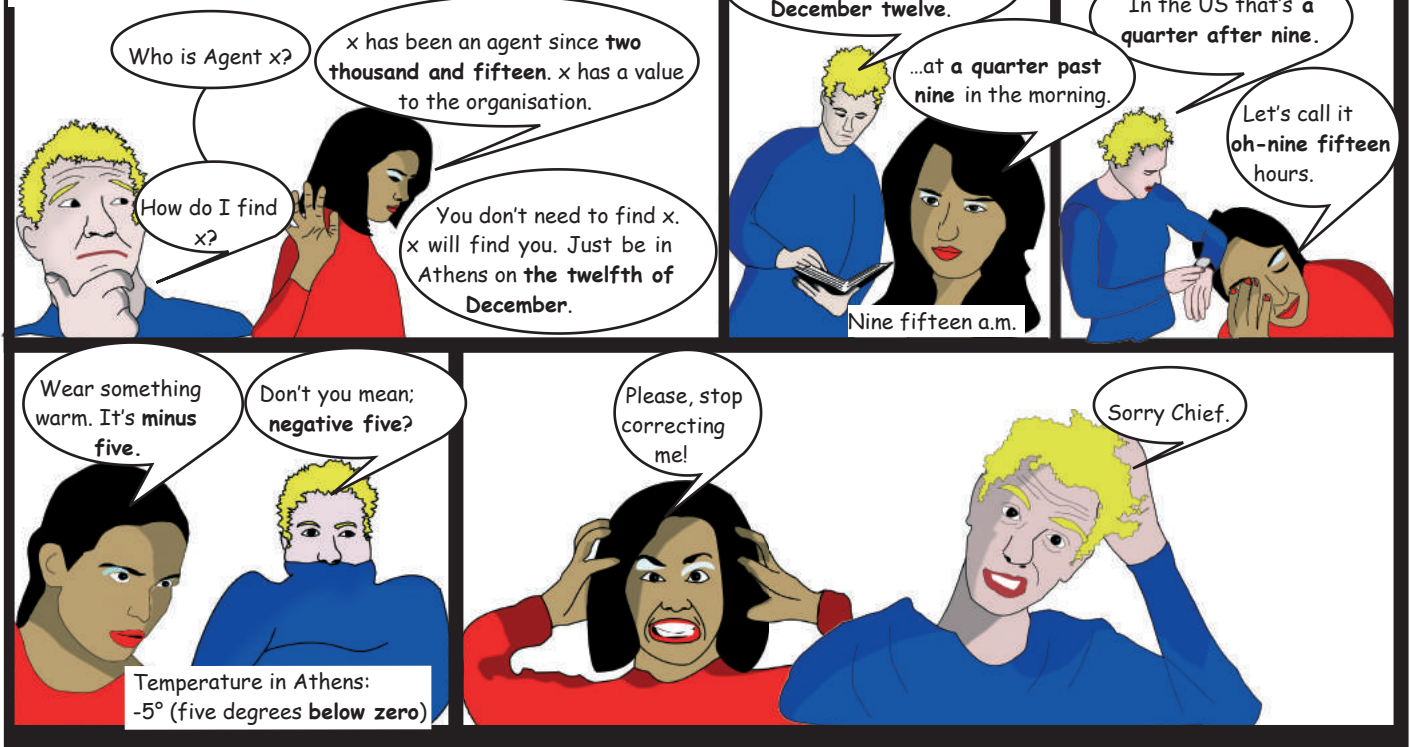
8

DATES AND TIMES

Rule 1. For times such as 6:15 in American English use *after*. Example: *a quarter after six*. In British English use *past*. Example: *a quarter past six*. British and American English both use to. Example: 8:45 is *quarter to nine*.

Rule 2. Use a.m. or p.m. for 12-hour clock times. Example: *two thirty p.m*. Do not use a.m. or p.m. with 24-hour clock times. Example *oh-eight- fifteen* (08:15)

Rule 3. For dates in British English the day comes first, then the month, then the year. Add *the* and *of* to the date. Example: *The first of November two thousand and six* (1st Nov. 2006 / 1-11-06) In American English the month comes before the day and year. Example: July four two thousand (7/4/2000)

Rule 4. For years before 2000 say them as two separate numbers. Example: *fourteen ninety-two* (1492), *seventeen hundred* (1700), *eighteen hundred and one or eighteen oh one* (1801). For years after 2000 say them as one complete number. Example: *two thousand* (2000), *two thousand and three* (2003).

FINDING x
Part one continued

Comprehension

1. When did x become an agent?
15 years ago
When x was 15
In 2015

2. When must Scott go to Athens?
On 12/12
On 1.2.12
On 12.1.2.

3. At what time will Scott meet x?
9.15 p.m.
21.15
09.15

4. In what three ways can you say –25°?

Dates and times
Speak these dates and times aloud with a partner.
1. The year 1713
2. 1914-18
3. 2nd August
4. (in words) 5.12.2017 (American)
5. (in words) 30.6.1925 (British)
6. (in words) The time 10.45 (American)
7. The time 9.05 (British)
8. (American)
9. (British)
10.

Read aloud this airport announcement
Good morning. The date is 6/6 and the time is now 9.12.
Will passengers for flight OJ192 departing for Johannesburg at 09.31 please go to departure gate T17.
We regret to announce that flight PM090 for Moscow is delayed by 45 minutes. Departure time is now expected to be at 10.30.
Will Mr. Smith travelling on flight FW663 to Amsterdam and due to depart at 11.47 from gate Z16 please report to the transit desk.

VULGAR & DECIMAL FRACTIONS

Rule 1. Speak vulgar fractions with a cardinal number (one, two etc.) on top and an ordinal number (fifth, tenth etc.) on the bottom. Example: *seven eighths* (⅞) .

Rule 2. If the top number is more than one, the bottom number is plural. Example: ⅝ is *five eighths*. However, you can say vulgar fractions like this: *seven over eight* (⅞).

Rule 3. Vulgar fractions end in –th(*s*) except ¼, ⅓, ½ (quarter, third, half). Plural of half is *halves*.

Rule 4. Put 'and' between full numbers and fractions. Example: 2⅜ is *two and three eighths.*

Rule 5. The dot in a decimal fraction is a *point.* Speak the numbers following the point separately. Example: 2.05 is *two point zero five* or *two point nought five*.

DOUBLE / TREBLE / -FOLD

When two or three numerals are the same in a series, you can use *double or triple* . Example: phone number 3555612 is *three triple-five six one two.*

x2 is *double*, x3 is *treble*, x4 is *fourfold*, x10 is *tenfold* etc. Example: *Prices have increased fivefold.*

Meet Agent twenty-two over seven.

Agent ²²/₇ Head of Research.

He sounds irrational.

FINDING x continued

Now pay attention and memorize these numbers.

Operating system: **seven point oh-five**. Check

Password: **treble three one**. Check

Laptop operating system: 7.05
Laptop password: 3331.
Emergency phone number: 44044.

Phone number: **Double four** zero double four. Check

The **laptop** case is in two **halves**.

Check.

The laptop goes in the top **half**...

the **bottom half** is a secret compartment.

To open the secret compartment move the dial ¼ **of a turn clockwise.**

One quarter. Check.

He goes on and on.

Turn the dial ⅔ of the way around and you activate a bomb. The case will explode.

Two thirds of the way - and bang! Check.

Here is your ticket to Athens.

And stop saying 'check'!

Ch...

A little later...

ATHENS TR189 Dep: 18.05

DEPARTURES

Agent Four-Fifths knows that success in this mission means **a three-fold** pay increase.

Flight TR **one-eight-nine** to Athens departs at **eighteen-oh-five**.

FINDING x continues in chapter 2.

The largest number with a name is a *googleplexian*.
If ⅛ is **an eighth** what is ¹/₉ₒₒ𝓰ₗₑₚₗₑₓᵢₐₙ?

Speak these numbers aloud:

07.30	9½	3 ⅓
09.109	³/₂	6 ¼
15.2976	888 ⁸/₈₀	
3.14159	2ˣ/ᵧ	
telephone number: 11188700.		

Complete these sentences

Throw a _____ six with the dice to win.

_____twenty on a dart board is the highest possible score of sixty.

Temperatures have gone up from 10° to 40°. That's a _____ increase.

Prices have increased _____ from $10 to $50.