

WHAT DO WE NEED MATHS FOR?

Business

What possible use could graphs be in the real world?

Most businesses will use graphs to analyse how well they are doing and to see how they can improve. There are loads of different types of graphs, but here are some common ones.

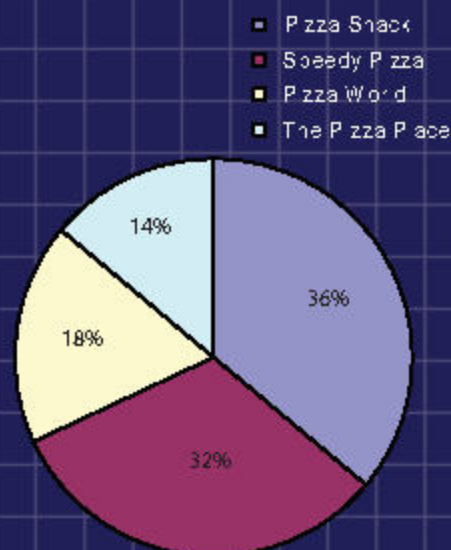
If you owned a pizzeria, you would want to know how it was doing compared to the other pizza places in town. You can do this by looking at a pie chart (right).

The pie chart is drawn by working out the percentage of customers that go to each restaurant in a month.

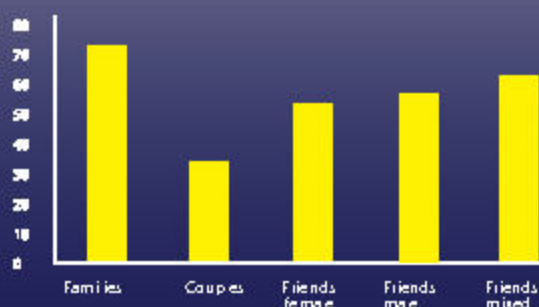
Say you run The Pizza Place. From the pie chart, you can see that this has the smallest share of customers.

This tells you that you need to attract more customers away from the other pizzerias. One way you could do this is through advertising.

Percentage of customers in the last month



Types of customer in the last month



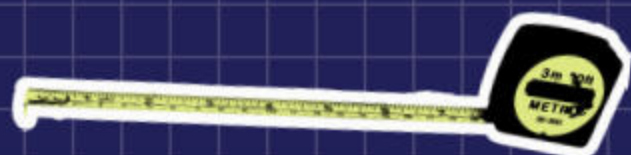
But how will you know who to advertise to? You can use a bar chart to look at what sort of people come to your restaurant and aim adverts at the types that visit the least.

Look at the bar chart (left). From this you can see that the type of people that eat at The Pizza Place most are families. The type who eat there the least are couples.

This tells you that you might want to attract more couples to your restaurant.

WHAT DO WE NEED MATHS FOR?

Decorating



Why should you bother learning how to find the area of a rectangle, a triangle or a circle? Or how to find their corresponding perimeters?

Most rooms can be split up into sections made out of these three basic shapes and, once you can do this, you're in the perfect position to start decorating.

Decorating a house can be an expensive business. Paying somebody to do it for you can be even more expensive! So how can you get the best looking house for the lowest price? By buying only what you need to cut down on waste.

A standard 2.5-litre can of paint can cover 9 m^2 . If the room is 2 metres high and the doors and windows cover 4.5 m^2 , how many cans of paint will you need to cover the room?

Splitting the room up into simple shapes, you can find its perimeter. Most of this is straightforward but you will need to use Pythagoras' theorem ($a^2 + b^2 = c^2$) to work out the length of the diagonal lines.

Summing all the lengths, you get a perimeter of 18.2 m.

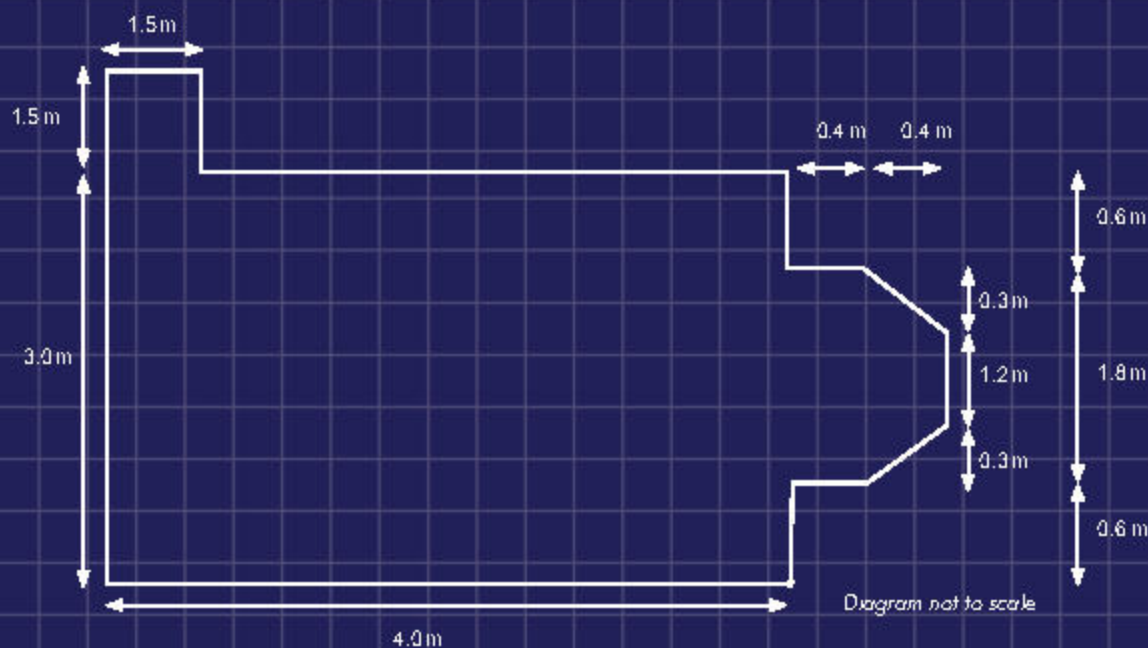
To find the area of the walls, you multiply the length (the perimeter) by the height. In this case, the length is 18.2 m and the height is 2 m. So you get an area of 36.4 m^2 . Don't forget to subtract the area that the doors and windows cover:

$$36.4\text{ m}^2 - 4.5\text{ m}^2 = 31.9\text{ m}^2$$

Finally, to work out how many cans of paint you need, you divide the area of the room by the area a can covers.

$$31.9\text{ m}^2 \div 9\text{ m}^2 = 3.544 \text{ (3 d.p.)}$$

So, to cover the room, you'll need four cans of paint!



WHAT DO WE NEED MATHS FOR?

Shopping

So why do you need to learn about percentages?

Well, percentages are one of the most common forms of maths that you find in everyday life. They can be found in adverts on TV, on the high street and on the internet. And what do they relate to?



Shopping!

Shopping is something everyone has to do. Whether it's food, clothes, computer games or shoes, everyone has to buy something at some stage.

The best time to go shopping can be when the sales are on. Many deals are on offer, but how do you know which is the best one?

If the original cost of the item is £7, which is the best deal?



three
for
two

Three for Two!

Three for Two would cost you £14 and you would get three.



2 for
£10

2 for £10

2 for £10 would save you £4, compared to buying two separately.

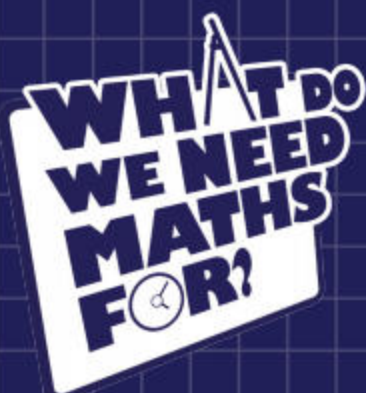


30% off
EVERYTHING

30% off Everything!

30% off would save you £2.10 per item. So if you bought one it would cost £4.90, if you bought two they would cost £9.80 and if you bought three they would cost £14.70.

If you only wanted one or two, the best deal would be 30% off but, if you wanted three, the best deal would be Three for Two!



Holidays



When would you possibly need to use conversions in the real world? Here is one situation which can involve three different types.

Going abroad is an exciting experience and guess what? You can still use maths!

Take, for example, a trip to the United States. Lots of opportunities for using maths will arise, mostly using conversions.

Let's start with money. Buying things in the US might seem more expensive than buying things here in the UK, but you have to take into account the exchange rate.



Depending on the exchange rate, £100 might get you \$144.70. So every dollar you spend in the US is worth 69p back home. This means, if you want to work out how much you're really spending, you multiply the amount in dollars by £0.69.

If you watch the weather forecast in the US you might be surprised to see that the temperatures are a lot higher than you expect.

This is because, in the US, temperatures are measured in degrees Fahrenheit, whereas here in the UK we tend to measure the temperature in degrees Celsius.

To find out how hot it's going to be, you need to use a temperature conversion:

$$C^{\circ} = \frac{5}{9}(F^{\circ} - 32).$$

So you subtract 32 from the temperature in degrees Fahrenheit and multiply by $\frac{5}{9}$ to get the temperature in degrees Celsius.

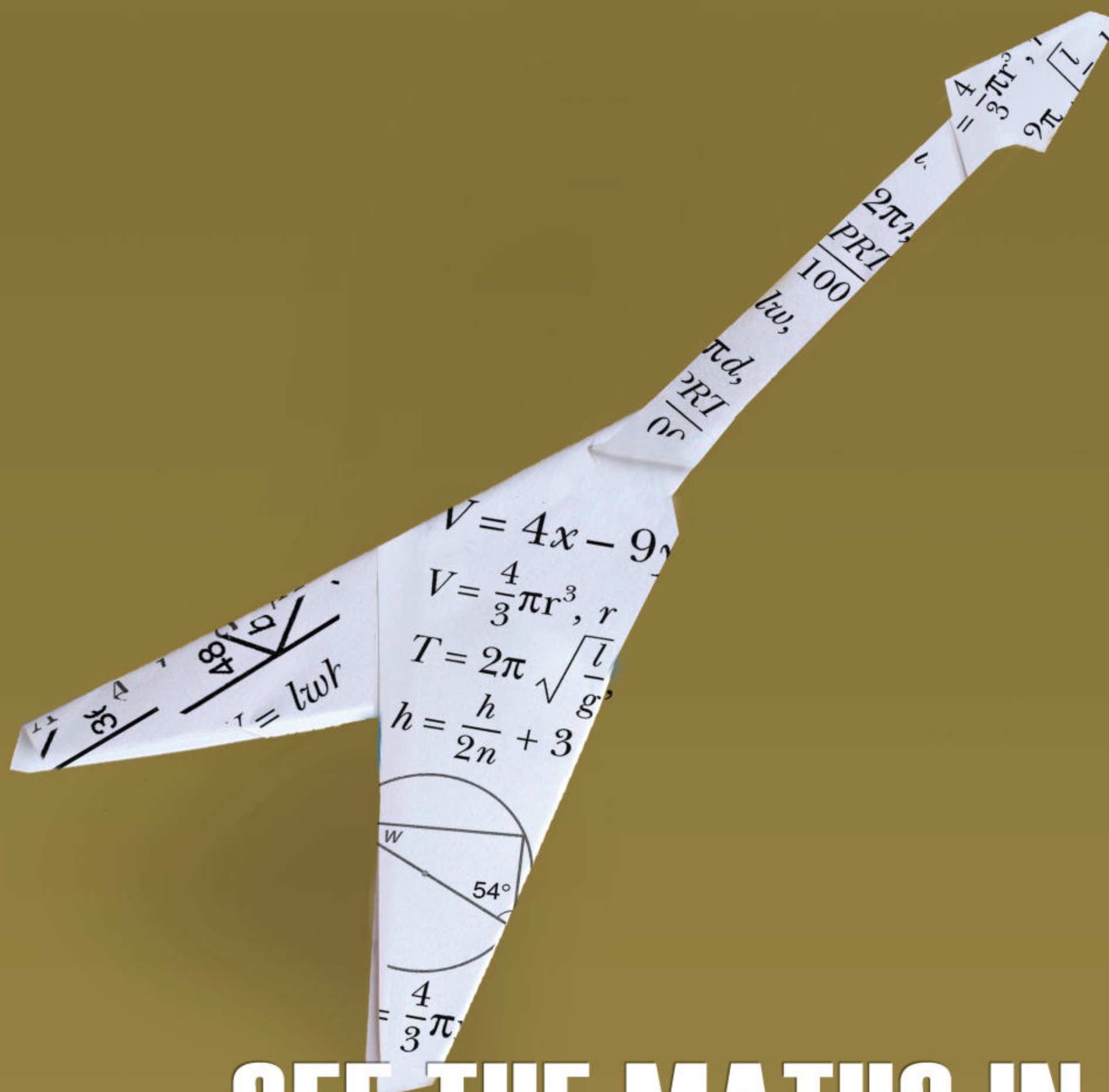
Hiring a car can be a convenient way of travelling around the US.

However, not only will you have to get used to filling the car full of 'gas' instead of 'petrol', you will also find that gas is sold by the gallon instead of by the litre.

If you want to know how much to put in your car, you need to be able to convert US gallons to litres. 1 US gallon is equivalent to 3.78 litres.

So, to find the number of litres, you multiply the number of gallons by 3.78.





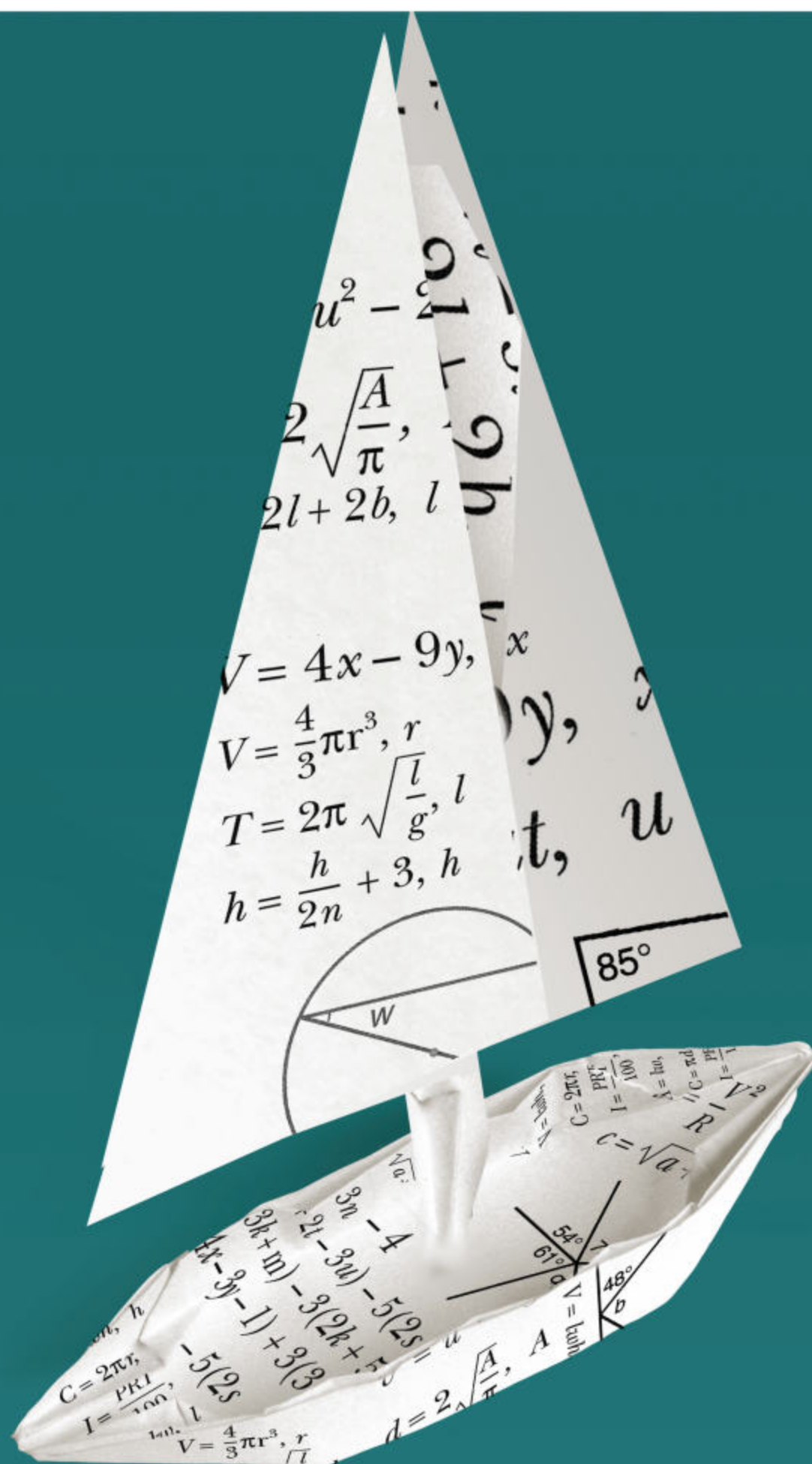
SEE THE MATHS IN MUSIC



more maths grads
multiplying opportunities

Ever wondered why some songs are so catchy? The theory of tuning and scales can be traced back to Pythagoras who first noticed the ratios of frequency intervals between notes. Symmetries and pattern in the structure of a song also play a role in ensuring that it hits number one, all of which has a firm theoretical grounding in maths!

For more information about the More Maths Grads project or for general enquiries please visit:
www.moremathsgrads.org.uk and www.mathscareers.org.uk



SEE THE MATHS IN NAVIGATION



more maths grads
multiplying opportunities

Getting from A to B is simple when you rely on your Sat Nav or let Air Traffic Control do the work. What you don't see are the people developing software, modelling satellite movements and tracking aircraft. And what you see even less of is the maths they rely on – you wouldn't get to your destination without it!

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SEE THE MATHS IN SPORT



more maths grads
multiplying opportunities

An athlete will tell you it's all about pace and timing. In training, the difference between decreasing your lap time by 0.1 or 0.2 of a second can make the difference between a gold medal and a silver medal. A footballer uses instant calculations of angles, speed and distance before scoring – even using quadratic equations to score the perfect goal!

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WHEN WILL I EVER NEED MATHS?

Well, you might have to use it in Business Studies...

- Choose a **sampling method** and design a **questionnaire** to test consumers' views of a new soft drink.
- Calculate the **percentage change** in number of employees between two given years.
- Work out the amount of **money** received by workers with **hourly rates** who also work overtime.
- Analyse data from a **line graph** showing the changing **percentage** of households with internet access.
- **Substitute** values into a **formula** to calculate **average** cost.
- Know how to **draw** and **analyse** a break-even graph.
- Use financial information to **calculate** gross profit, net profit and the profit margin.
- **Calculate** missing figures in a cash-flow forecast.
- Analyse a **pie chart** showing market share.
- **Calculate** the **interest** paid on a loan with a given **rate of interest**.
- Use **exchange rates** to **convert** between currencies inside and outside the Eurozone.

Maths has lots of applications and is a vital asset in many degrees and careers.
To find out more about where maths is used and maths-related careers visit:
www.mathscareers.org.uk

WHEN WILL I EVER NEED MATHS?

Well, you might have to use it in Food Technology...

- Design a **questionnaire** to find out people's views about a new product.
- Calculate the **percentage** of carbohydrate in a product.
- Use your knowledge of **pie charts** to design a meal which follows the advice of the 'eatwell plate'.
- Work with **money** using a **calculator** to compare the prices in three different supermarkets.
- **Substitute** values into a **formula** to work out your body mass index.
- Understand the **ratio** of fat to flour in different pastries.
- **Calculate** the cost per portion for a recipe, **rounding** your answer to a suitable **accuracy**.
- Use **negative numbers** to compare low and high temperature methods of food preservation.
- Use your knowledge of **metric units** to **convert** between grams and kilograms when following a recipe.
- Convert between **metric** and **imperial** units of **weight** and **volume** when using old recipes.

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WHEN WILL I EVER NEED MATH?

Well, you might have to use it in ICT...

- Create a logo using a graphics package by **reflecting** and **rotating** a design.
- Use spreadsheet **formulae** to calculate the **cost** of a school field trip.
- Use your knowledge of **angles** to program a robot turtle to draw a **triangle** or other **polygon**.
- Use live data from a sensor to plot a **graph** showing the temperature of melting ice.
- Format **number** or **currency** data to the correct number of **decimal places**.
- **Convert** between pixels and centimetres when comparing **dimensions** of images.
- Work with **timings** and different **speeds** in frames per second when animating in Flash.
- Produce a spreadsheet to use an **iterative formula** which will calculate the **cube root** of a number.
- **Calculate** actual **dimensions** from a **scale diagram** produced by a computer-aided design package.

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