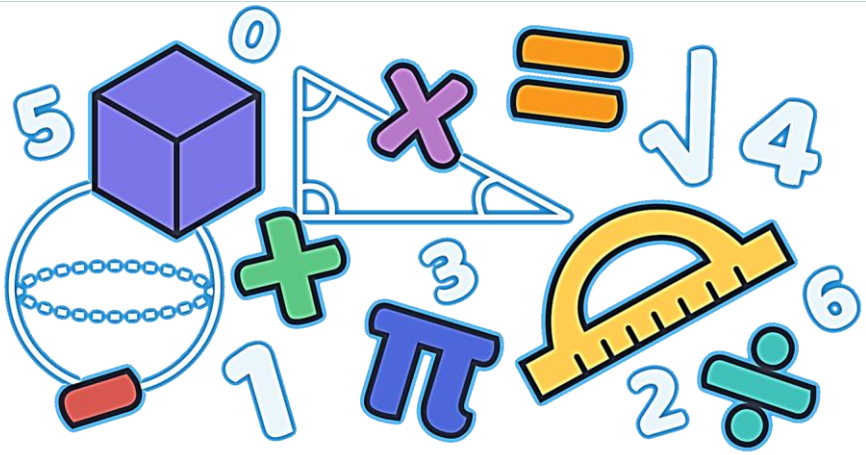



# Maths Summer Activity Booklet

This booklet is filled with mathematical puzzles and activities to get you thinking about the maths in the world around you. Some of them are quite tough, but don't worry, it's all just for fun.

The activities are all optional, but if you choose to take part in them we would love to see how you got on when you join us in September.

You can fill out this booklet and bring in any additional pictures or drawings you complete separately.

Name : _____

# Meet the Team

Miss Ashfield
Head of Department
Room 6
23 is my favourite number, however, I love that my room is room 6 as 6 is a perfect number -what makes it a perfect number?!

Mr Turner
Second in Department
Room 8
Favourite Number:
43,000,000,000,000,000,000 is 43 quintillion and is the number of ways a Rubik's cube can be set.

Mrs Morgan
KS3 Lead
Room 10

Favourite area of Mathematics: Algebra, as it's just one big puzzle waiting to be solved.

Mrs Buren
Maths G&T and SEN Lead
Room 8a

Favourite Maths fact: There are 13 letters in both "eleven plus two" and "twelve plus one".

Miss Brown
Room 4
Favourite Maths phenomenon:
0.999..." and "1" represent exactly the same number.

Mr Challis
Room 7
Mathematical conundrum: My age is a multiple of 2 and half of a cube number. How old am I?

Miss Farley
Room 9

Favourite Maths fact:
x% of y = y% of x

Ms Karim
Room 5
Favourite Maths fact: The term "algebra" comes from the Arabic word "al-jabr", meaning "the reunion of broken parts".

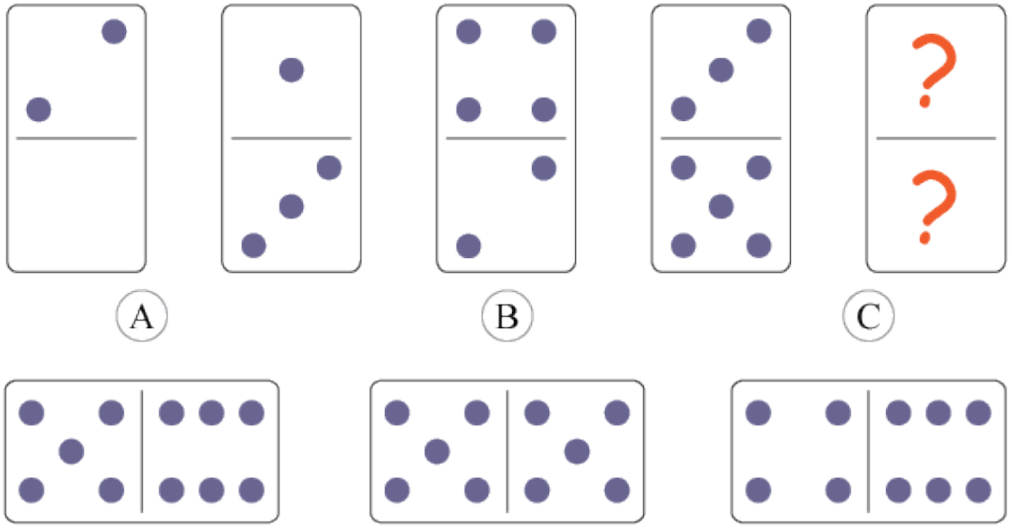
Mrs Taberner
Room 5
Favourite Mathematical application: That the Fibonacci Sequence and the Golden Ratio show up in so many places in the real world!

Mrs Weaver
Room 30

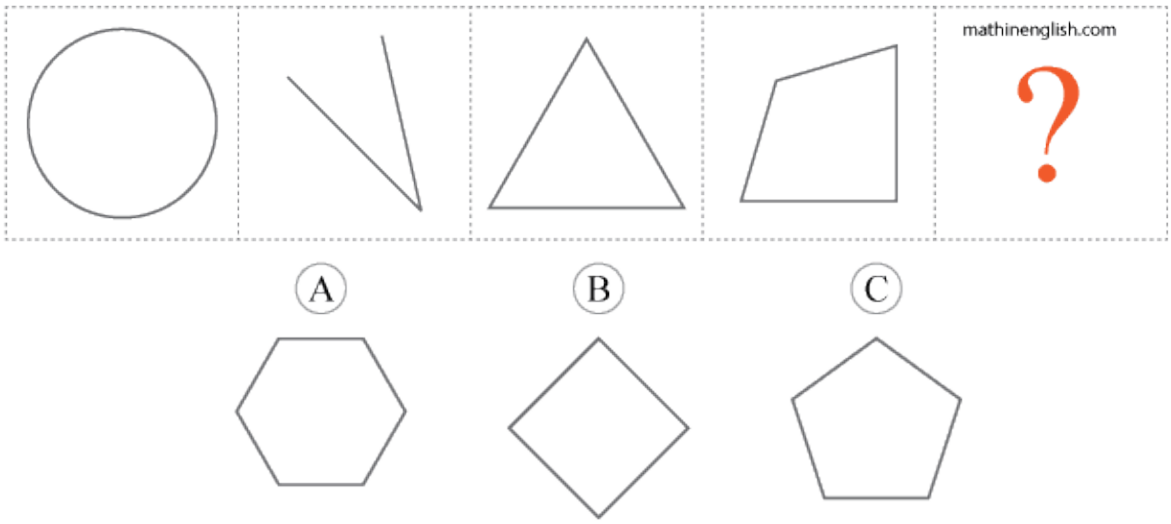
Favourite Maths Fact: Every odd number has an e in it!

# Brain teasers

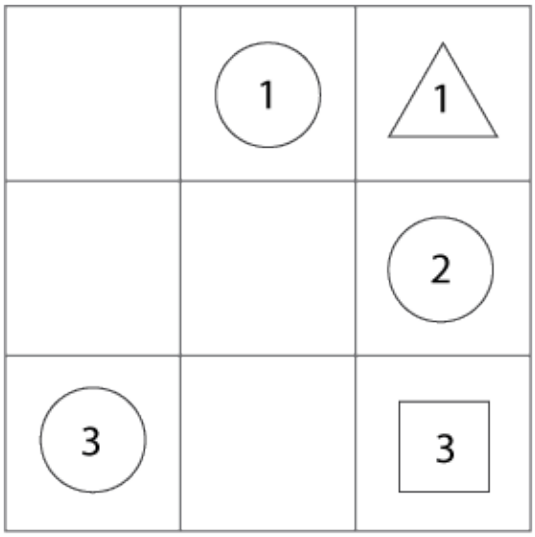
Which domino completes the pattern?



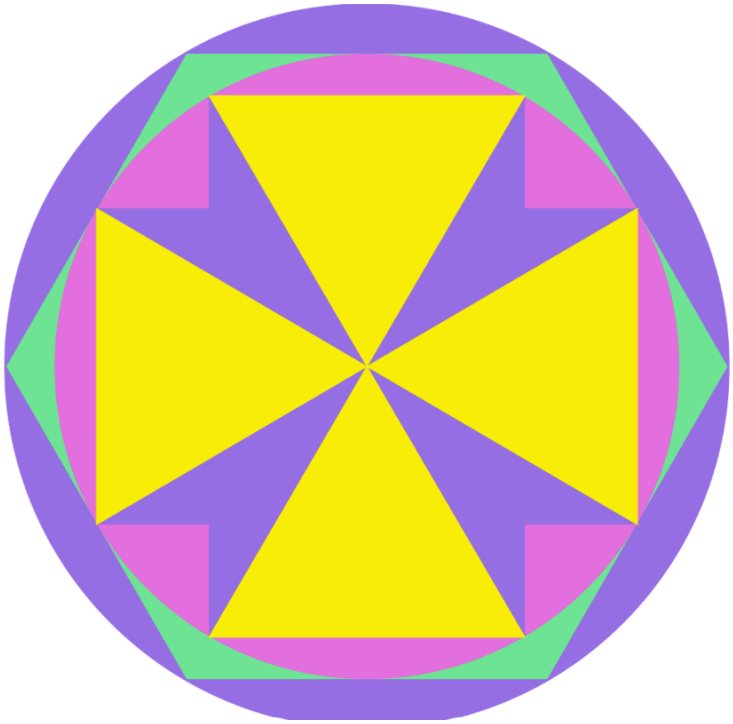

Which shape completes the pattern?




What 4 shape and number combinations are needed to complete the shape box ?



# Shape up!



What do you see?

How many different shapes are there?

How many triangles are there?

How many 3D shapes do you see?

How would you re-create this picture? What mathematic equipment would you need?

Can you draw it below? Or make a larger version on a separate piece of paper to be displayed in our department.

# Yohaku Puzzles

For each of the puzzles below fill the 9 empty squares to make the totals at the end of each row or column. Each puzzle tells you the restrictions of what can go in the grid and how you are combining the values (addition or multiplication).

| | | | |
|---|---|---|---|
| | | | 15 |
| | | | 10 |
| | | | 20 |
| 6 | 21 | 18 | + |

Use each number 1 to 9 once only.

| | | | |
|---|---|---|---|
| | | | 7 |
| | | | 18 |
| | | | 21 |
| 11 | 14 | 21 | + |

Use 9 different positive integers.

| | | | |
|---|---|---|---|
| | | | 35 |
| | | | 25 |
| | | | 40 |
| 60 | 20 | 20 | + |

Don't use 10, 20, 30, 40, 50

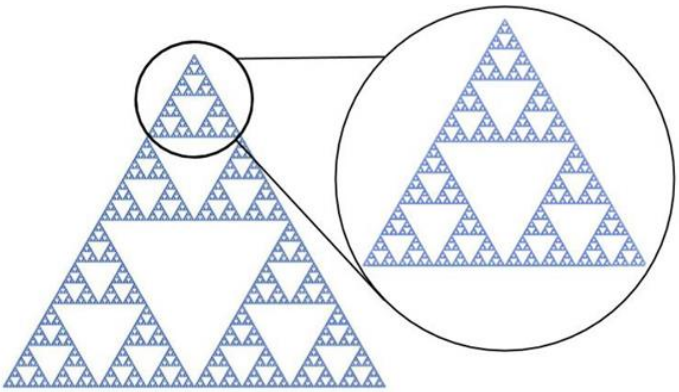
| | | | |
|---|---|---|---|
| | | | 64 |
| | | | 35 |
| | | | 198 |
| 6 | 168 | 440 | × |

Use 9 different whole numbers.

# Fractals in Nature

A fractal is a pattern that repeats at different scales - a tiny piece has the same pattern as a larger piece, which has the same pattern as the whole. This repeating pattern is called self-symmetry.

In mathematics, we can find perfect fractals, like this Sierpiński triangle. Each triangle has perfect self-symmetry with the whole and the pattern could continue to infinity.



In nature, there are many imperfect fractals. A tasty example is this Romanesco Broccoli - if you cut one spiral off, it would look like a miniature version of the whole head of broccoli.

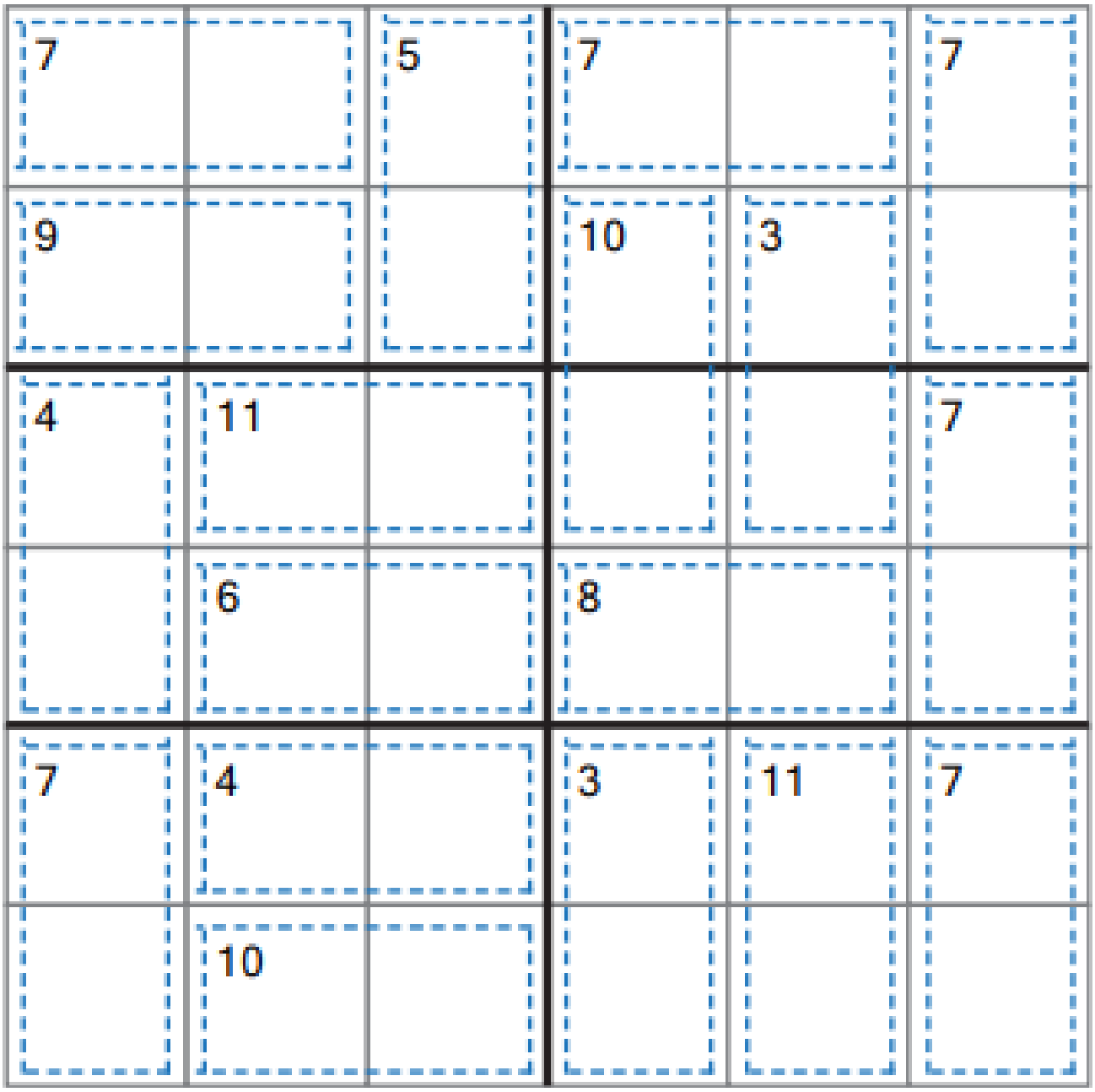
The branch patterns of many trees are also imperfect fractals.

What fractals can you spot in the real world? Look around your house, your garden, your local area.

Take photographs or draw pictures of the fractals below. Or make a larger version on a separate piece of paper to be displayed in our department.

# Killer Sudoku

Fill in the numbers 1 to 9 so that each number only appears once in each row, column and dotted sub-region (cage). The sum of the numbers in each dotted cage must equal the printed clue numbers in the top left corner of the cage.



BBC goodfood

Here are the ingredients from the BBC goodfood website to make fairy cakes.

## Ingredients

110g/4oz butter or **margarine**, softened at room temperature

110g/4oz **caster sugar**

2 free-range **eggs**, lightly beaten

1 tsp **vanilla extract**

110g/4oz **self-raising flour**

1–2 tbsp **milk**

**For the icing**

300g/10½oz **icing sugar**

2–3 tbsp water

2–3 drops **food colouring**

hundreds and thousands, or other cake decorations

1. If 110g = 4oz how many grams are there in 1 ounce?

2. If this recipe is for 12 fairy cakes, how many eggs would you need to make 18 fairy cakes?

3. If 300g of icing sugar covers 12 cakes how many grams would be needed to cover 9 cakes?

4. How many millilitres are in a tablespoon?

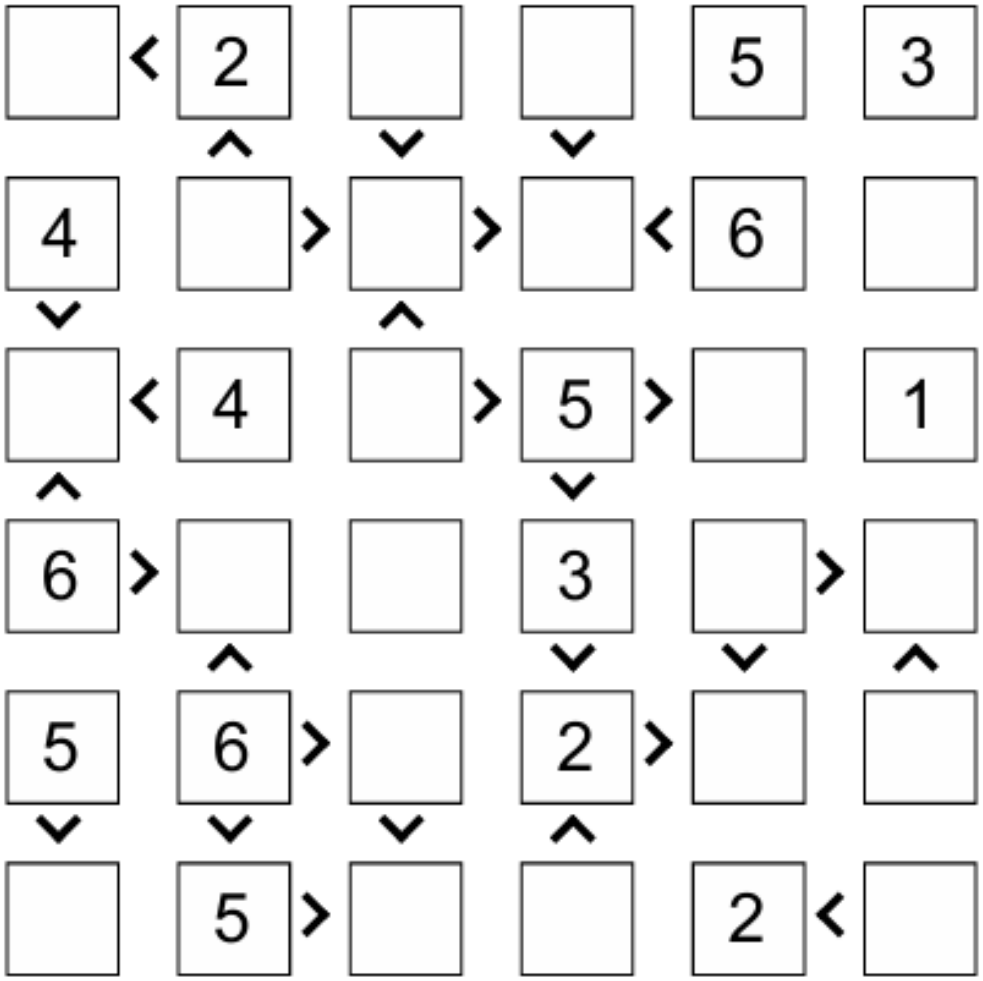
If you wanted to make the fairy cakes, the instructions are below.

## Method

1. Preheat the oven to 180C/160C Fan/Gas 4 and line 2 x 12-hole fairy cake tins with paper cases.
2. Cream the butter and sugar together in a bowl until pale. Beat in the eggs, a little at a time, and stir in the vanilla extract.
3. Fold in the flour using a large metal spoon. Add a little milk until the mixture is a soft dropping consistency and spoon the mixture into the paper cases until they are half full.
4. Bake in the oven for 8–10 minutes, or until golden-brown on top and a skewer inserted into one of the cakes comes out clean. Set aside to cool for 10 minutes, then remove from the tin and cool on a wire rack.
5. For the icing, sift the icing sugar into a large mixing bowl and stir in enough water to create a smooth mixture. Stir in the food colouring.
6. To ice the fairy cakes, drizzle the icing over the cakes, sprinkle with decorations and set aside until the icing hardens.

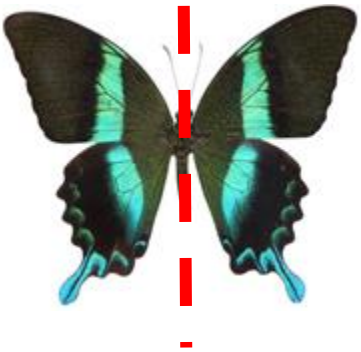
# More or Less

Place the numbers 1 to 6 so that each row and column contains the digits 1 to 6. More or less symbols are placed between some of the cells indicating that numbers must be higher or lower than a neighbouring cell.
< means the number to the left is smaller than the number on the right e.g. 2 < 5
> means the number to the left is larger than the number on the right e.g. 5 > 2



# Symmetry of the world

There appears a lot of symmetry in the world. Both line symmetry and rotational symmetry.



A butterfly has line symmetry because you can reflect it in the line running down its centre without changing its appearance.

A flower has rotational symmetry because you can turn it and it still looks the same.

What symmetry can you spot in the real world? Look around your house, your garden, your local area.

Take photographs or draw pictures of the symmetrical items below. Or make a larger version on a separate piece of paper to be displayed in our department.

# Make it a Game

Mathematics is just one big puzzle waiting to be solved. When you start to see this, it becomes less scary and more fun.
There are lots of games that can help you to hone your mathematical skills.
Why not challenge someone in your house to one of the following mathematical games.

## The 24 Game

You will need:
2 or more players
A Pack of cards - Remove the 12 picture cards (KQJ) and any Jokers. Ace = 1 etc.
Pen and paper per player
Countdown timer

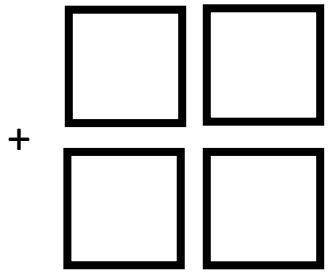
How to play:
Shuffle the pack of cards and lay the pile face down on the table.
Each player picks a card and turns it face up on the table, until there are 4 cards displayed.
Start the countdown timer (e.g. 2 minutes).
Each player individually tries to make '24' using only the cards on the table and any of the 4 operations E.g. If you have a 6, 10, 2 and 6, the solution could simply be: 6 + 10 + 2 + 6 = 24
The winner is the first person to make 24, or the person who gets the closest within the time period.

## Make 100

You will need:
2 or more players
A die
Pen and paper per player

How to play:
The aim of the game is to create 2, 2-digit numbers that add together to get a total closest to 100.

Each player should make a copy of the grid to the right.
The first player rolls the die.
Each player, in secret, places the digit into one of the 4 boxes.
The next player rolls the die and the number is placed in secret.
Continue until 4 numbers have been placed.
Add together the 2 2-digit numbers.
The person with a total closest to 100 wins.



# Plan a day out!

Budgeting, time management and route mapping are all mathematical skills people use on a daily basis.

Use the information below to plan a day out for you, 3 friends and 2 responsible adults to Alton Towers Theme Park.

Park Tickets

Theme Park

**1 Day Ticket**


**Save when you book in advance**

✓ Experience over 40 rides and attractions

✓ Includes CBeebies Land, Sharkbait Reef by SEA LIFE and The Gardens

✓ Guests under 90cm visit for free

**Choose date**

Choose Date
Monday, Jul 28, 2025

**Choose your number of tickets**

Individual
Gate Price: ~~£68.00~~
Online Price: **£37.00**

1

**Add to cart**

Are you eligible to any free tickets?

How much would it cost if you buy your tickets online?

How much would it cost if you buy your tickets on the day?

What is the price difference?

**2 FOR 1 TICKETS**

**AT ALTON TOWERS RESORT OR THORPE PARK RESORT WHEN YOU BUY SEABROOK CRISPS***

BRILLIANT BY Seabrook SINCE 1945 THE BAGFUL

How does this offer change the cost of your tickets?

Lunch


**Adult £22.50**
**Teen £16.00**
**Children Under 12 £12.75**

How much will it cost to feed your group at the pizza and pasta buffet?

Travel

Here is the timetable for the X41, a bus that runs once a day to Alton Towers.

**X41 Stafford - Uttoxeter - Alton Towers Resort**

| *Days of operation* | Monday to Saturday (excluding Bank Holidays) |
|---|---|
| *Service number* | X41 |
| *Restrictions* | A |
| Stafford, opp. Railway Station | 0840 |
| Stafford, Pitcher Bank | 0845 |
| Weston, Old School Close | 0858 |
| Uttoxeter, Railway Station (arrive) | 0914 |
| Uttoxeter, Railway Station (depart) | 0920 |
| Uttoxeter, Bus Station | 0925 |
| Rocester, High Street | 0934 |
| Denstone, The Tavern | 0939 |
| Alton, Smithy Bank | 0944 |
| Alton Towers Resort, Plaza | 0951 |

What time would you need to leave your house if you were going to walk to stafford railway station to catch the bus?

The cost for the bus is listed below.

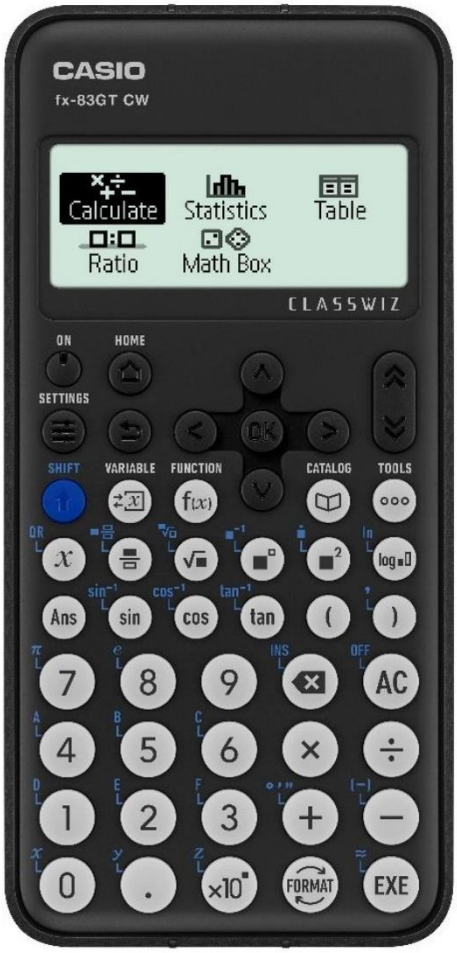
**Adult single fares**

| | Stafford | County Showground (Stafford) | Weston (Stafford) | Uttoxeter | Rocester | Denstone | Alton | Alton Towers Resort |
|---|---|---|---|---|---|---|---|---|
| **Stafford** | | | | | | | | |
| **County Showground (Stafford)** | | | | | | | | |
| **Weston (Stafford)** | | | | | | | | |
| **Uttoxeter** | | | | | | | | |
| **Rocester** | | | | | | | | |
| **Denstone** | | | | | | | | |
| **Alton** | | | | | | | | |
| **Alton Towers Resort** | £11.00 | £11.00 | £11.00 | £9.00 | £3.00 | £3.00 | £3.00 | £3.00 |

**Under 19 and concessionary pass holder single fares**

| | Stafford | County Showground (Stafford) | Weston (Stafford) | Uttoxeter | Rocester | Denstone | Alton | Alton Towers Resort |
|---|---|---|---|---|---|---|---|---|
| **Stafford** | | | | | | | | |
| **County Showground (Stafford)** | | | | | | | | |
| **Weston (Stafford)** | | | | | | | | |
| **Uttoxeter** | | | | | | | | |
| **Rocester** | | | | | | | | |
| **Denstone** | | | | | | | | |
| **Alton** | | | | | | | | |
| **Alton Towers Resort** | £7.00 | £7.00 | £7.00 | £6.00 | £2.00 | £2.00 | £2.00 | £2.00 |

How much would a return trip cost for your group?




# Calculator Confidence

When you get to your GCSE's 2 out of 3 of your exams are completed with the use of a calculator.

Its important you get your own early and for you to get to grips with its use.

A scientific calculator like the one shown here is what you need and will allow you to calculate with fractions, powers, roots and trigonometric functions.

Try using a calculator with the following activities.

## Re-Order!

Work out the value of these four expressions and order them from the smallest to the largest value.

$40 \times 8 \div 4 + 40 - 15$

$40 \times 4 \div 8 + 40 - 15$

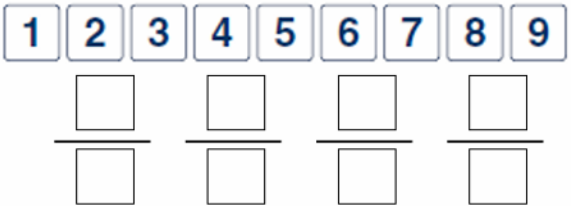
$40 + 8 \times 15 - 40 \div 2$

$15 \times 4 - 40 \div 8 + 40$

- Use brackets to change the value of the four expressions ( )
- Can you reverse the order of the four expressions so the one that had the largest value now has the smallest?
- Is there more than one way to do it?

## Fun with Fractions!

- Choose 4 different pairs of numbers from the digits 1 to 9
- Place them in the boxes to make 4 proper fractions
- Order your fractions from smallest to largest
- Can you do this without using common denominators?




Are you using a scientific calculator?

This key changes your answer from a fraction to a decimal and back.

# Required Equipment

Being prepared for your lessons means you will be ready to just straight into learning.

We would like for you to have the following equipment in every one of your maths lessons:

- A scientific calculator – we believe the Casio are the easiest to use however any scientific calculator would be fine.
- A 30cm ruler
- A compass
- A protractor
- Pens
- Pencils
- Rubber
- Sharpener

In September there will be the chance to order these through the school if you are unsure on what to get.

# Home Learning

We have 2 online platforms we ask you to use for homework or additional home learning.

Times Table Rockstar's many of you will already use at primary school. Knowing our times tables is such an important skill to help you with all of Mathematics, all the way through to your GCSE exams! You will continue to use TTRS once you get to Walton.

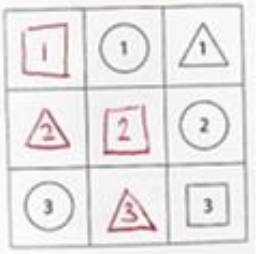
Another online platform we use at Walton is Dr Frost.

This website covers all of maths from KS2 through to A Level. It is used for both homework and independent revision.

We are really looking forward to continuing your mathematical journey with you in September!

## Answers

### Brain teasers: domino B



### Shape C

### Killer Sudoku

| | | | | | |
|---|---|---|---|---|---|
| 6 | 1 | 2 | 3 | 4 | 5 |
| 4 | 5 | 3 | 6 | 1 | 2 |
| 3 | 6 | 5 | 4 | 2 | 1 |
| 1 | 2 | 4 | 5 | 3 | 6 |
| 5 | 3 | 1 | 2 | 6 | 4 |
| 2 | 4 | 6 | 1 | 5 | 3 |

### More or Less

### Yohaku puzzles – possible solutions

| | | | |
|---|---|---|---|
| 2 | 7 | 6 | 15 |
| 1 | 5 | 4 | 10 |
| 3 | 9 | 8 | 20 |
| 6 | 21 | 18 | + |

Use each number 1 to 9 once only.

| | | | |
|---|---|---|---|
| 2 | 1 | 4 | 7 |
| 3 | 5 | 10 | 18 |
| 6 | 8 | 7 | 21 |
| 11 | 14 | 21 | + |

Use 9 different positive integers.

| | | | |
|---|---|---|---|
| 29 | 1 | 5 | 35 |
| 13 | 9 | 3 | 25 |
| 18 | 10 | 12 | 40 |
| 60 | 20 | 20 | + |

Don't use 10, 20, 30, 40, 50

| | | | |
|---|---|---|---|
| 2 | 4 | 8 | 64 |
| 1 | 7 | 5 | 35 |
| 3 | 6 | 11 | 198 |
| 6 | 168 | 440 | × |

Use 9 different whole numbers.

### Calculator Confidence: Re-Order Smallest

$40 \times 4 \div 8 + 40 - 15$

$15 \times 4 - 40 \div 8 + 40$

$40 \times 8 \div 4 + 40 - 15$

Largest $40 + 8 \times 15 - 40 \div 2$