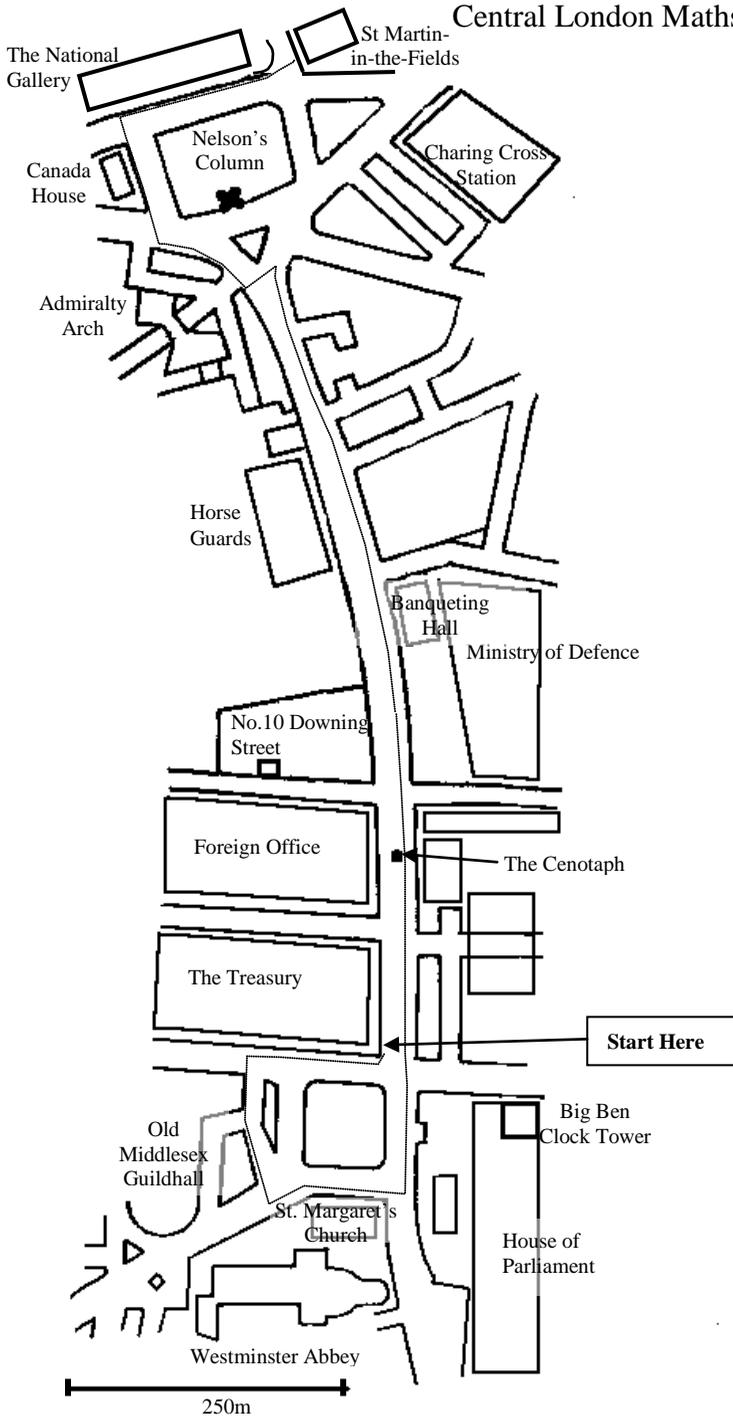


The ATM/MA
London
Branch
Central
London
Maths Trail



Engage with Mathematical relationships, objects and ideas as you walk from Parliament Square to Trafalgar Square

Central London Maths Trail



Welcome to the ATM/MA London Branch Central London Maths Trail

You are going to take a walk from Parliament to Trafalgar Square.

You should start on Parliament Street next to the entrance to underpass leading to Westminster underground station. You should be diagonally opposite the houses of Parliament. If you face Westminster Abbey, you should be on the right hand side of the road. ...Start here:

Check the map to see your route.



The purpose of this trail is to take you on a walk down one of Britain's most historic streets. On the way you will collect information about the things that you see. At the back of this booklet there is a set of mathematical activities for you to try, using the information you have collected.

There are four sets of things to look out for on your trail:

- Dates and times and other uses of Number
- Estimation opportunities
- Shapes
- Roman Numerals

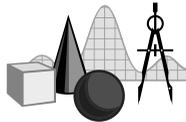
As you walk round keep a look out for all of these. If you need extra space or you find your own examples use pages 17 to 20.

You should start by the entrance to the underpass, leading to Westminster underground station, on Parliament Street, next to the Treasury building. (If you face Westminster Abbey you should be on the right hand side of the road).

Part 1: Round Parliament Square

Turn right to walk around large building you are outside (this is the Treasury Building). Cross the road to continue round the outside of the square.

Stop and look at the building of the Royal Institute of Chartered Surveyors (RICS).



Take photos of at least three interesting shapes from the RICS building. Add a sketch and write notes on page 1 of this booklet.

The next building is the former Middlesex Guildhall.

Look at the signs in the doorway. The modern signs have been placed over the original stones.

Write down when the foundation stone was laid. (The answer is in Roman numerals - look at page 21 if you need help). The line you want is on the right hand side and is the sixth line down. The signs are almost impossible to read, so write down what you can, then look the building up on the internet.

Cross the road to continue round the outside of the square. Walk alongside Westminster Abbey.

When you reach St. Margaret's Church stop and read the sign.

When was St. Margaret's Church consecrated?

When did it become the church for the House of Commons?

Look for a date in stone in Roman numerals on St. Margaret's Church. What date is it? What is it telling you?

A little further along next to the road there is a plan showing details of all the buildings around the square. (Take photos of the map for further research).

Write down the names of at least three of the buildings and when they were built.

Walk to the end of the church and cross the road to continue round the outside of the square. Walk alongside the open square of the Houses of Parliament.

Estimate how tall the tower that holds Big Ben is.

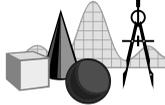
- A person is roughly 2 metres high.
- Roughly how tall is a double decker bus?
- Roughly how many double decker buses high is the tower?
- Roughly how high is the tower?

Walk up to the end of the square.

Cross the road to return to Parliament Street.

Part 2: Whitehall

Walk along Parliament Street towards Trafalgar Square. Look down the first road you reach, called Derby Gate, to the large red brick building. This was the first New Scotland Yard. It was completed in 1890 as the headquarters of London's police force.



*Take photos of at least three interesting shapes from the building.
Add a sketch and write notes on page 1 of this booklet.*

Look across the road at the gateway with three arches.

Look above the columns either side of the central arch. There are two initials and a number in roman numerals. Copy them down here.

They refer to a King. Which one is it?

(You may have to wait for the buses to get out of your way!)

A little further along, in the middle of the street is the war memorial known as the Cenotaph (the word means a monument to people whose bodies lie somewhere else).

The Cenotaph has two dates written in Roman numerals.
Write them down.
(What do you guess they stand for?)

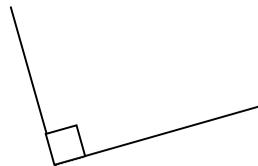
Notice that after the Cenotaph, the road changes its name to Whitehall.

When you reach a large black iron gateway, look down Richmond Terrace for an excellent view of the London Eye, Millennium Wheel. (Opposite Richmond Terrace are the gates to Downing Street).

Estimate how many pods there are for carrying people on the London Eye.

It may help to find two spokes at right angles. You can count the number of pods between those two spokes.

Work out how many pods there are altogether.



Continue past the large white Ministry of Defence building. There are four statues in front of it.

There are three statues with dates. Write down who they are and what the dates tell you.

Being very careful of the traffic cross to the middle of the road to the Women's Memorial.

The work of how many women in World War II is commemorated by the Women's Memorial?

Just before you reach the next road (Horseguards Avenue) you are standing beside a very significant building – the Banqueting House.

Read one of the signs to tell you all about the Banqueting House.

Write down the times that the Banqueting House is open.

What are the three different prices for getting in?

Now look above the doorway.

Write down when King Charles passed through the door on his way to execution.

If you can get into the entrance lobby, take a leaflet about the banqueting hall. Also, have a look at the passageway to the left. Take a photo to help in a discussion of perspective and vanishing points.

Cross Horseguards Avenue. Look across the road to the Horse Guards building.

Draw the clock on the tower above the Horseguard's building.
Put in *all* of the numbers.

Look across the road at the buildings, the signs, the posts, the vehicles, the people. Look all around you for numbers of any kind.

Write down any numbers that you can see.
Write down what each one is telling you.
Take photos and make as long a list as you can ... use page 17 for extra space.

When you reach the next road (Whitehall Place) look down it. You should be able to see St. Paul's Cathedral. Look up to Trafalgar Square to see Nelson's Column.

Estimate how tall St. Paul's Cathedral is.

Write down which you think is taller: Nelson's Column or St. Paul's Cathedral.

Look at the bottom of page 14 to find out how tall they really are. If you were wrong, explain why.

Part 3: Trafalgar Square

When you reach the top of Whitehall cross this busy road safely. Walk round the corner into The Mall. You should see an archway across the road. This is Admiralty Arch.

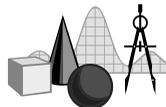
Write down when the arch was built.
(The answer is in Roman numerals).

Cross The Mall and continue round Trafalgar Square. Cross at the pedestrian crossing to reach Canada House.

Write down the office hours at Canada House.

Write down the appointment hours.

Photograph interesting shapes from the façade of the National Gallery and write notes on page 19.



Estimate how wide the National Gallery is.

- Imagine a person lying down. How many people would be as long as a bus?
- So how long is the bus? (Estimate each person is 2 metres).
- How many buses wide is the National Gallery?
- Now work out your estimate for how wide the National Gallery is.

St. Paul's Cathedral is 111 metres high.
Nelson's Column is 56 metres high.

Walk to the end of Canada House and cross again to reach the National Gallery.

Walk along the front of the National Gallery.

There is a statue labelled Jacobus Secundus.
Write down the date (in Roman numerals).

Walk up the steps of the National Gallery.

What shape is Trafalgar Square?

Walk down the steps again.

Write down the opening times for the National Gallery.

Which days is it closed?

Walk to the end of the gallery. Stop and look up at the Church of St. Martin's in the Fields.

Write down when the church was built (it is in Roman numerals).

The tower of St. Martin's has lots of circles in it.
Work out how many there are.
Take a photo or make a sketch of the tower to help you.

The trail ends here. You can easily reach Charing Cross Station from this point.

Numbers, Dates and Times

On this page make a note of any numbers you see and what they are being used for.

Estimation Opportunities

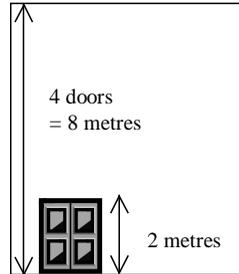
Don't forget, an estimate is *not* a guess! To make a good estimate you should break the problem down to smaller parts. You can make a good guess for each small part. Then you calculate your estimate.

For Example:

I want to estimate the height of a tall room.
The room is roughly the same height as 4 doors.

I guess the door is roughly 2 metres high
(most doors are). So I calculate:

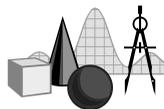
I estimate the height of the room is $2 \times 4 = 8$
metres high.



Use this space to do the calculations for your estimation opportunities. (The height of the tower with Big Ben and the width of the National Gallery).

Shapes

On this page make a note of any extra interesting shapes you spotted on your trail. Take a photo or make a sketch and name each shape.



Roman Numerals

Use this page to write down any extra Roman numerals you saw on your trail. Also work out any Roman numerals. Look at the next page to help you.

How to read Roman Numerals



The Roman numerals are:

I is 1	V is 5	X is 10	L is 50
C is 100	D is 500	M is 1 000	

We can make up numbers like this:

III is 3	VI is 6	XXII is 22
LX is 60	CL is 150	DC is 600
MDC is 1 600	MMCCCXXI is 2 321	

There are some tricky things to look out for:

When the Romans wanted to write 4, they wrote IV meaning 1 before 5.

In the same way they wrote:

IX for 9	XL for 40	XC for 90	CD for 400
CM for 900			

So they would count up like this:

I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV and so on.

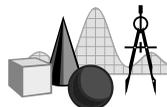
Check that you understand these:

LIX is 59	XLIV is 44	XCVII is 97
CCCXC is 390	MMCD is 2400	MMCMXC is 2 990
MCDXLIX is 1449	CMIX is 909	

Activities

On this trail you have collected lots of information. These pages contain some questions you may like to think about. Also they have ideas about making use of the information you have collected.

Shapes



- Different objects are made in different shapes. Why? (E.g. most windows are rectangular, but some are not).
- What are the most common shapes? Why?

Look at your page of interesting and unusual shapes.

Why have the shapes been used?

Why is one shape better than another to do each job?

Write about your ideas.

Dates



You have collected lots of information about dates.

Answer questions like these:

- How long did they live for?
- How long ago was it built?
- When will its centenary be? (Or when was it?)
- When will other anniversaries be celebrated?

Opening Hours



You wrote down the opening hours for the Banqueting Hall, Canada House and the National Gallery.

- How long is each one open for in a normal week?
- How many hours would that be in a year? (Did you write down which days each one is closed?)

Costs



- How much would it cost a family with two adults and 2 children to visit the Banqueting House? (How much cheaper is a family ticket?)
- If the staff are paid £8.50 per hour. How many adults would need to visit to pay the daily costs of 5 staff members?
- If 12 people, paying £17 each fit in a London Eye pod, how much money will be taken for one full ride? The ride lasts 30 minutes and doesn't stop. How much will they take in one (12 hour) day? Extend to consider the total operating costs and expected occupancy rates.

We hope you have enjoyed doing this trail. There have been many other maths trails produced around London, although it may take some effort to locate them. We have created a web site www.mathstrails.org.uk, where details of all of the trails we have created or know about are posted. Please contribute to this site by adding information or indeed other trails. The following were known to have existed in 2001:

- St. Paul's Cathedral
- The Royal Festival Hall (individual copies from the hall's information point, group bookings ring 020 7921 0846).
- The Hounslow Millennium Maths Trail (copies of the trail booklet from Hounslow libraries).
- Kingston-upon-Thames (copies of the trail booklet from Kingston Library).
- Kew Gardens (details from the Enquiry Unit on 020 8332 5622).
- Mile End Millennium Park Maths Year 2000 Maths Trail in Tower Hamlets (permanent signs guide you through this beautiful park).
- Lewisham and Stratford Town Centre Trails (copies at www.mathstrails.org.uk).
- Wisley Gardens Royal Horticultural Society, off the A3 near Guildford (contact 01483 224234).

This trail was written by Chris Olley,
(Contact: chris.olley@kcl.ac.uk)

www.londonmaths.org
www.mathstrails.org.uk