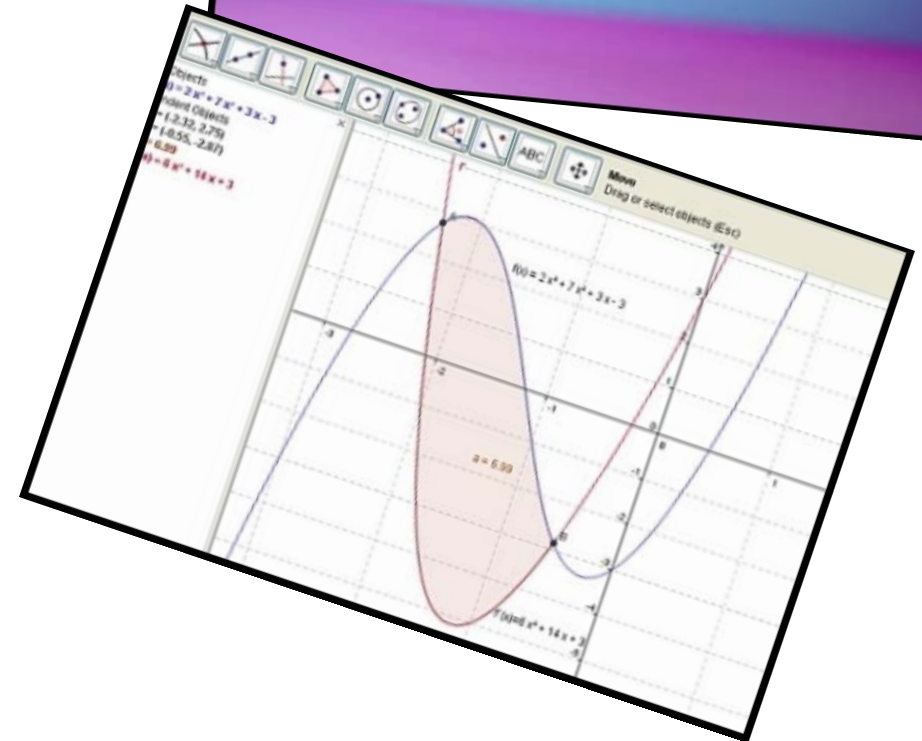
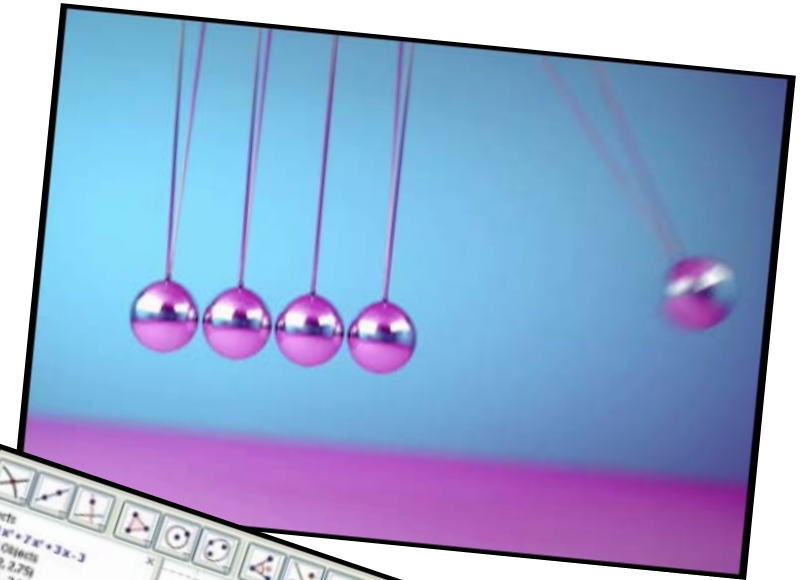




Content Covered:

- Key Staff
- Specification/Books/Resources
- Course Structure
- Wider Learning Offer
- Q&A
- Introduction to A Level Maths (Binomial Expansion)



A Level Maths Induction Day

Key Staff



Ms K Brewer (KBr) – Head of Maths kbrewer@williamperkin.org.uk

Mr V Bhardwaj (VBh) – 2iC Maths vbhardwaj@williamperkin.org.uk

Ms A Ratheram (ARa) – Head of Key Stage 5 aratheram@williamperkin.org.uk

Maths Teacher Breakdown

Teacher A Pure Maths and Statistics	Teacher B Pure Maths and Mechanics
Ms Brewer	Ms O'Connor
Ms Rashid	Mr Bhardwaj
Ms Ratheram	Ms Bajaria
Ms Goh	Ms Ratheram

Further Maths Teacher Breakdown

Teacher A Further Maths and Discrete Maths	Teacher B Further Maths and Mechanics
Mr Bhardwaj	Ms Ratheram

A Level Maths Induction Day

Specification/Books/Resources (Maths)



Exam Board Details

AQA (7357)

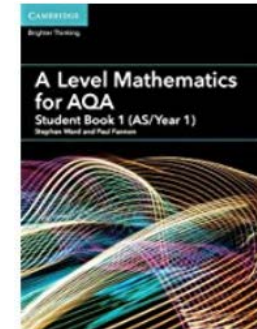
<http://www.aqa.org.uk/subjects/mathematics/as-and-a-level/mathematics-7357/specification-at-a-glance>

Textbooks

You will need one textbook in Year 12 which covers Pure Maths, Statistics and Mechanics. You are expected to bring this to every lesson. It costs £25.49.

A Level Mathematics for AQA Student Book 1 (AS/Year 1) (AS/A Level Mathematics for AQA)

Amazon link: https://www.amazon.co.uk/Level-Mathematics-Student-Book-Year/dp/1316644227/ref=sr_1_2?s=books&ie=UTF8&qid=1529414327&sr=1-2&keywords=a+level+mathematics+for+aqa+cambridge



Calculator

You need a Casio Classwiz calculator for A Level
Casio FX-991EX Scientific Calculator



Folders

You will need a ring binder for your maths lessons, alongside dividers. You may find it useful to buy a hole punch also.

A Level Maths Induction Day

Specification/Books/Resources (Further Maths)



Exam Board Details

AQA (7367)

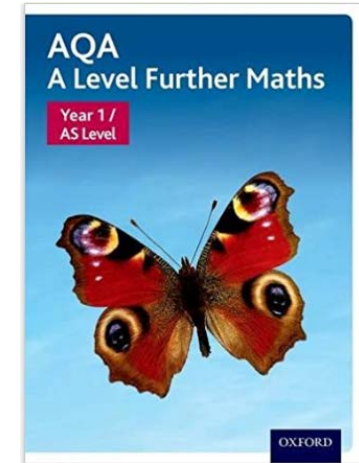
<http://www.aqa.org.uk/subjects/mathematics/as-and-a-level/further-mathematics-7367/specification-at-a-glance>

Textbooks

You will need a Further Maths textbook in Year 12, it costs £28.99.

AQA A Level Further Maths: Year 1 / AS Level Student Book

Amazon link: https://www.amazon.co.uk/AQA-Level-Further-Maths-Student/dp/0198412924/ref=sr_1_1?ie=UTF8&qid=1530189108&sr=8-1&keywords=aqa+a+level+further+maths+year+1+oxford



A Level Maths Induction Day

Course Structure



Pure and Statistics (A)	Pure and Mechanics (B)
1. Proof and Mathematical Communication (5)	1. Quadratic Functions (7)
2. Indices and Surds (3)	2. Coordinate Geometry (7)
Quarter 1 Assessments	
3. Polynomials (6)	3. Using Graphs (8)
4. Logarithms (8)	4. Introduction to Kinematics (4)
5. Differentiation (8)	5. Motion with Constant Acceleration (5)
Quarter 2 Assessments	
6. Applications of Differentiation (4)	6. Trigonometric Functions (10)
7. Working with Data (8)	7. Triangle Geometry (4)
8. Binomial Expansion (4)	8. Integration (7)
9. Probability (6)	Quarter 3 Assessments
Quarter 3 Assessments	9. Exponential Models (6)
10. Vectors (7)	10. Objects in Contact (6)
11. Statistical Hypothesis Testing (6)	11. Forces in Motion (5)
Quarter 4 Assessments	



Statistics

“Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write.” (H. G. Wells)

Did you know?

In contrast to previous years all of the statistics content will now be taught through the study of a large data set.

Content I will cover:

- Probability
- Standard Deviation
- Hypothesis Testing
- The Binomial Distribution
- Normal Distribution

How is this useful to me?

Statistics are widely used in many fields of study and employment and statistical literacy is a requirement for a full understanding of the modern world. Degrees in Psychology, Bio-Medical Science, Engineering, Economics, Actuary, Political Science and Business all have a large statistical component.



Mechanics

“The birth of science as we know it arguably began with Isaac Newton's formulation of the laws of gravitation and motion.” (P. Davies)

Did you know?

The new A-Level in Mathematics has a greater emphasis on modelling than in previous years. This will be particularly prevalent in the Mechanics content.

Content I will cover:

- Objects in Contact
- Newton's Third Law
- Forces in Motion
- Newton's Laws of Motion
- Projectiles
- Forces in Context
- Moments

How is this useful to me?

Mechanics helps us to organise the universe and understand the world around us. Degrees in Engineering, Life Sciences and Physics, all require a strong working knowledge of Mechanics.



Clubs, Maths Department

UKMT Senior (Individual Competition)

UKMT Senior (Team Competition)

Cryptography Club

Lecture Series, Maths Department

The Mathematics of Love

In this lecture we will be tackling some of the most common yet complex questions pertaining to love: What's the chance of us finding love? What's the chance that it will last? How does online dating work, exactly? When should you settle down? How can you avoid divorce? When is it right to compromise? Can game theory help us decide whether or not to call? Love, like most things in life, is full of patterns. And mathematics is ultimately the study of patterns.

The Mathematics of Murder

In this lecture we will be tackling how mathematics can be used in fighting crime. We will explore ideas around crime scene analysis and how geographical profiling can be used to catch serial killers. In the fight against crime for both the characters in CSI and the real police force, the secret weapon is mathematics.

Chaos Theory

In this lecture we will be exploring ideas around Chaos Theory and how a small change in one state can result in large differences in a later state. Can flapping your arms cause a hurricane in Florida? Was Hip-Hop music created as a direct result of a lightning strike in NYC in 1977? Was Lego invented as a direct result of a carpenter's house burning down in 1924?

Can Mathematics Make you a Better Footballer?

In this lecture we will be exploring why every major sport team in the world has hired a statistician on their coaching staff. From goalkeepers analysing how to save penalties and where they should stand on the goal line to strikers analysing the best place to shoot the ball. Has professional sport turned into a game of mathematics?

A Level Maths Induction Day

Any Questions?





Expand $(x + y)^0$

Expand $(x + y)^2$

Expand $(x + y)^1$

Expand $(x + y)^3$

Expand $(x + y)^4$

There must be an easier way!
Can we see any patterns in our results?

A Level Maths Induction Day

Taster Lesson



Our previous results:

$$(x + y)^0 \qquad \qquad \qquad 1$$

$$(x + y)^1$$

$$(x + y)^2$$

$$(x + y)^3$$

$$(x + y)^4$$

Can you predict what the next row will look like?

Can you explain how you got your result?

The answer to both those questions is “Yes” by the way, or at the very least you can have a go!

A Level Maths Induction Day

Taster Lesson



“To the power 0”



“To the power 1”



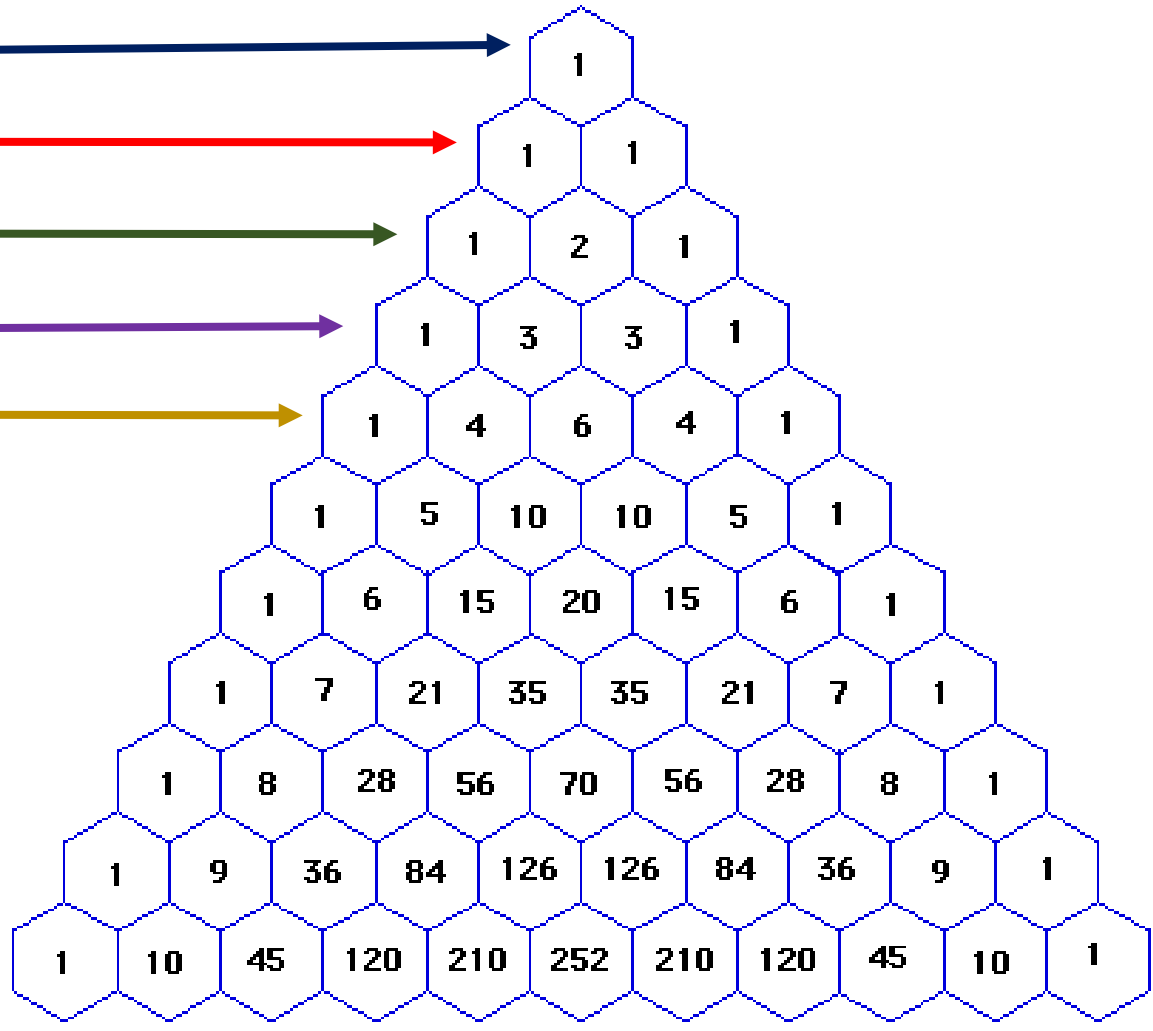
“To the power 2”



“To the power 3”



“To the power 4”



Can you spot any patterns?

How do you get the next row?

Fun Fact!
Ms Brewer's
Christian-middle
name is Blaise

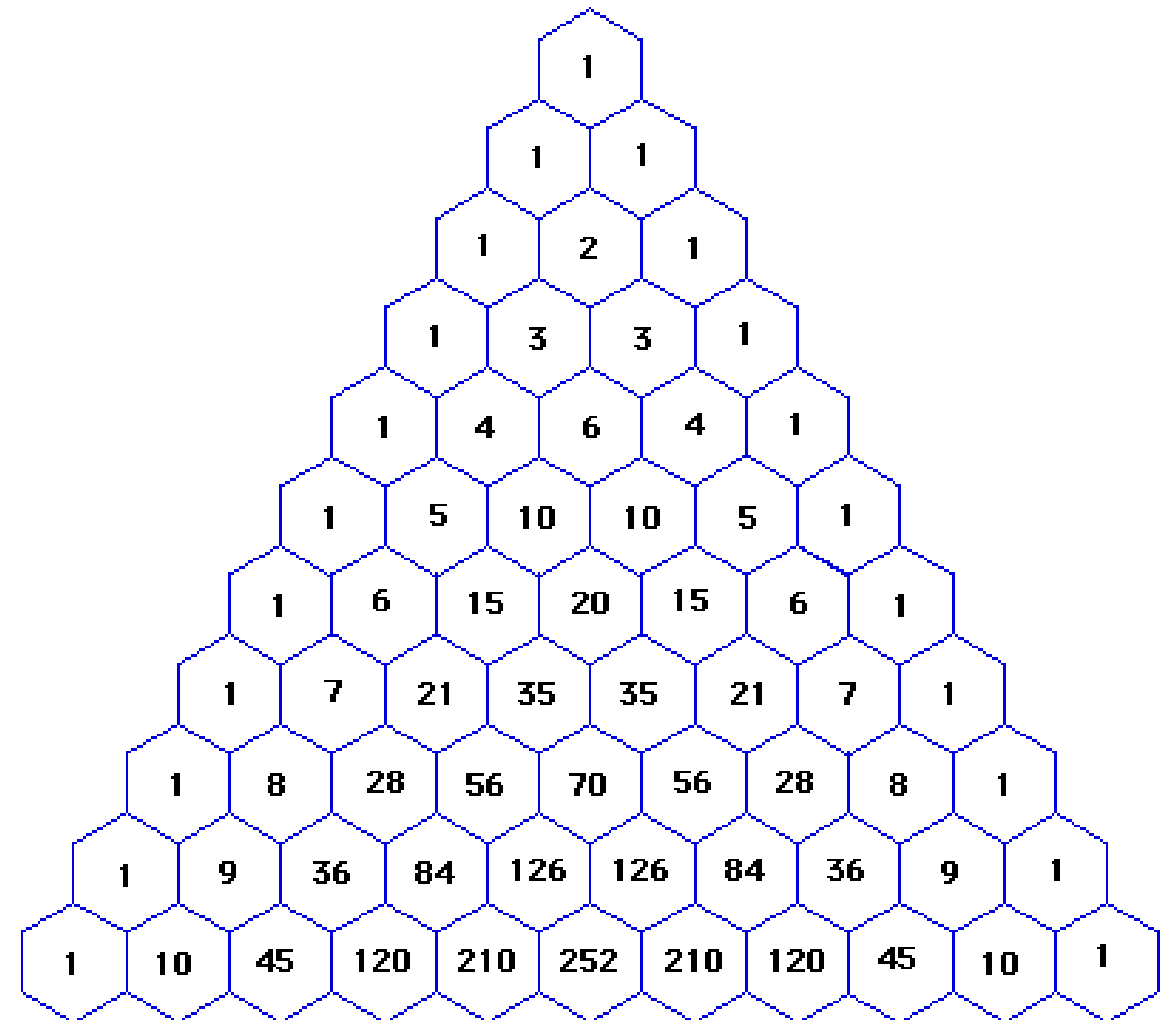
Blaise Pascal
1623-1662





Expand $(x + y)^5$

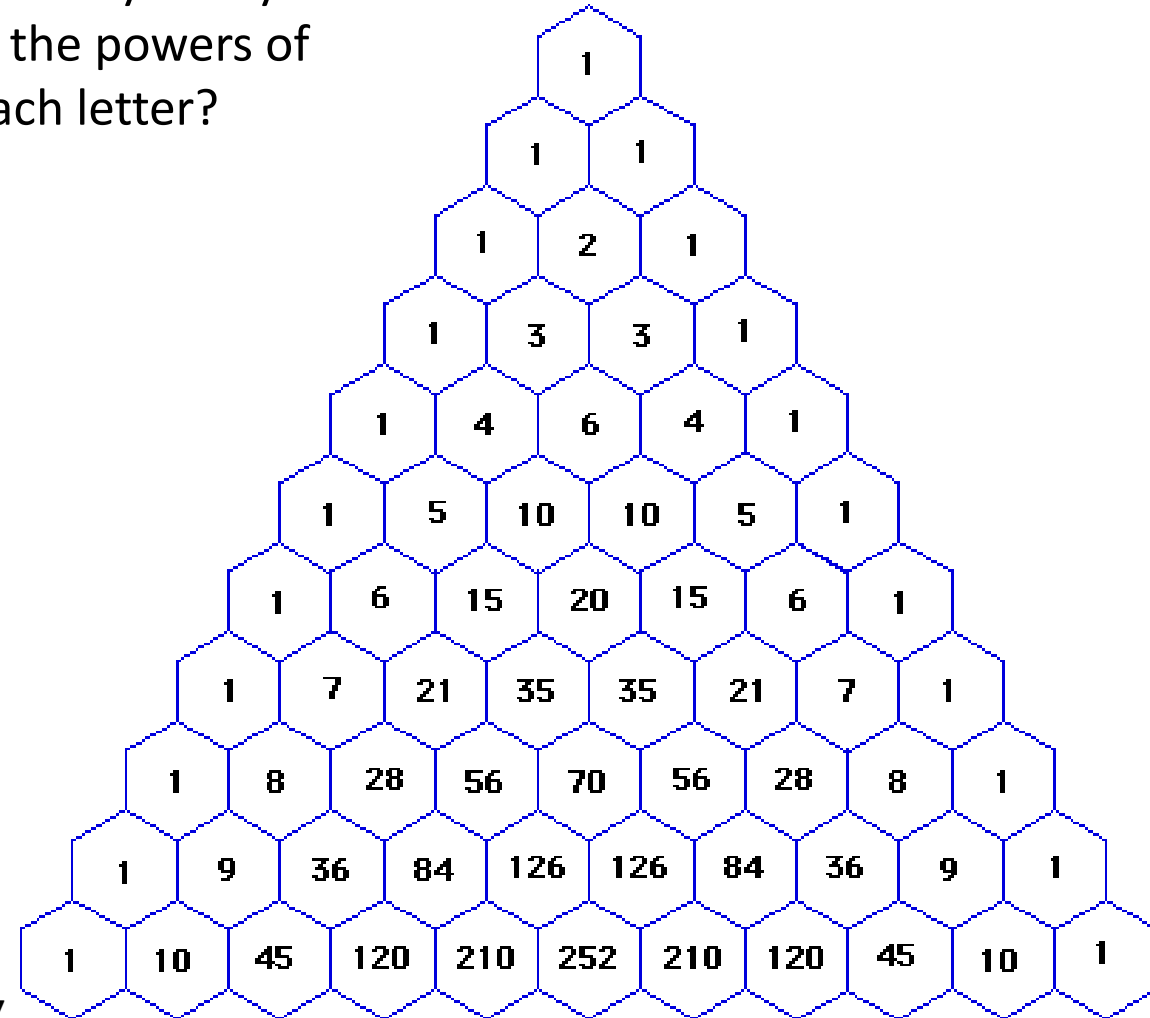
$$x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$$





Expand $(x + y)^7$

What can you say about the powers of each letter?



$$x^7 + 7x^6y + 21x^5y^2 + 35x^4y^3 + 35x^3y^4 + 21x^2y^5 + 7xy^6 + y^7$$



Try expanding these:

$$(1 - 3x)^3$$

$$(2 + 5x)^4$$

$$(2x - 3y)^6$$

$$1 - 9x + 27x^2 - 27x^3$$

$$16 + 160x + 600x^2 + 1000x^3 + 625x^4$$

$$64x^6 - 576x^5y + 2160x^4y^2 - 4320x^3y^3 + 4860x^2y^4 - 2916xy^5 + 729y^6$$

