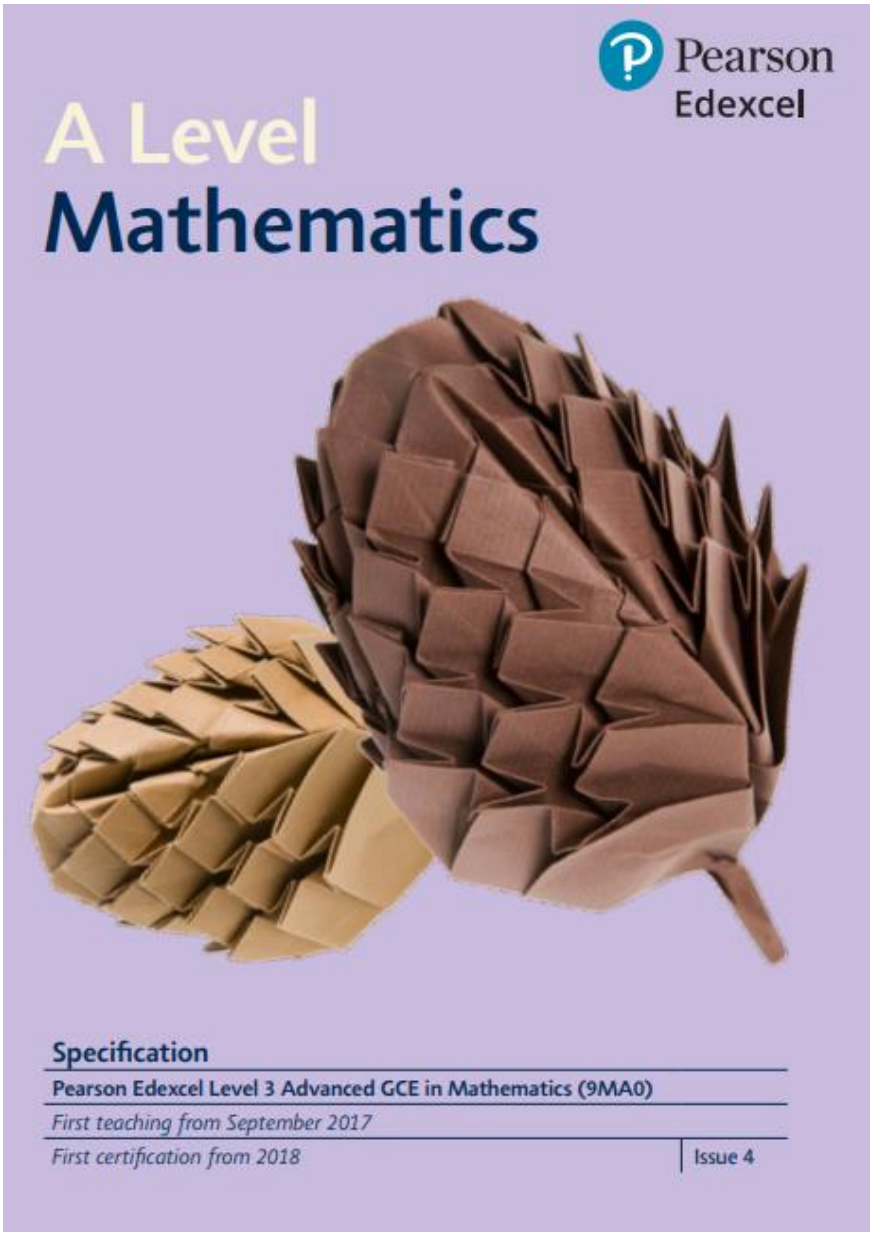
TRANSITION BOOKLET

Mathematics

Pearson Edexcel Level 3 Advanced GCE in Mathematics (9MA0)

https://qualifications.pearson.com/content/dam/pdf/A%20Level/Mathematics/2017/specification-and-sample-assesment/a-level-l3-mathematics-specification-issue4.pdf



Transition to Sixth Form:

Sixth Form Study

You are likely to study 3 subjects at Bolder Sixth form. Each subject will have six lessons per week. You can expect to engage in a wider range of learning strategies in lessons as well as independently. These could be anything from:

- Making and organising presentations.
- Seminar style reading and group work.
- Use of debate, discussion-based learning, TED-talks, and documentaries.
- Wider reading outside of lesson hours.
- Extended 1-1 practice of practical or experimental work.
- Flip learning – learning in your own time and presenting what you have found to the class.

Independent Study

A Levels and Applied Qualifications will require more study to be completed by you independently rather than with a teacher. At Bolder we recommend that you spend the same time studying outside of lessons as you do in lessons. Therefore, if you have 6 hours of Biology per week, this means that 6 hours should be spent revisiting notes, revising content, completing practice questions outside of the classroom each week also.

This pack will support you with starting to practice independent study over the summer period which will help you understand what works best for you.

What do you need to complete?

Over the summer it is expected that you engage with this transition booklet to support with your movement into A level Mathematics.

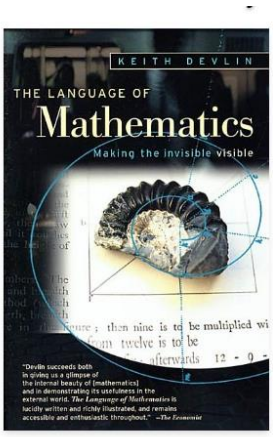
You must make a total of 200 credits through the summer.

The points for each task are outlined below:

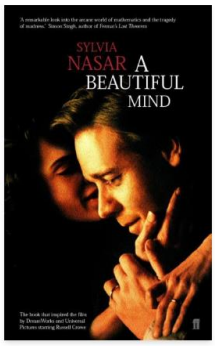
1. Problem solving assignment (**Getting ahead page 5**) –100 credits.
2. Algebraic processing skills task (**MyMaths**) – 50 credits.
3. Statistics- collection, collation, analysis and refinement task (**MyMaths**) – 50 credits.

These must be evidenced on your return in September.

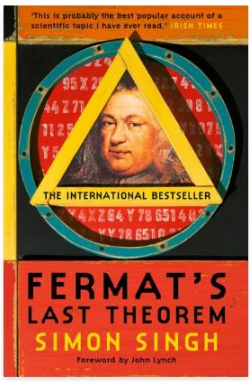
Book recommendations:



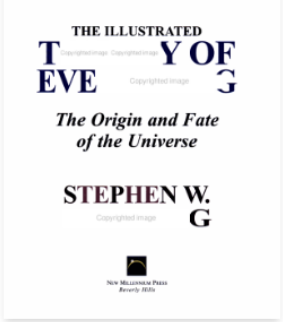
More than just the study of numbers, mathematics provides us with the eyes to recognize and describe the hidden patterns of life. Devlin shows us what keeps a jumbo jet in the air, explains how we can see and hear a football game on TV, allows us to predict the weather, the behaviour of the stock market, and the outcome of elections.



A Beautiful Mind is an unauthorized biography of Nobel Prize-winning economist and mathematician John Nash, it tells the fascinating story of the mathematical genius, mental illness, and miraculous recovery and success of John Nash Jr.



The story of the solving of a puzzle that has confounded mathematicians since the 17th century. In 1963, a schoolboy browsing in his local library stumbled across the world's greatest mathematical problem: Fermat's Last Theorem, a puzzle that every child can understand but which has baffled mathematicians for over 300 years.



Stephen Hawking is widely believed to be one of the world's greatest minds, a brilliant theoretical physicist whose work helped reconfigure models of the universe and define what's in it. Imagine sitting in a room listening to Hawking discuss these achievements and place them in historical context; it would be like hearing Christopher Columbus on the New World.

Getting ahead!

We recommend completing all the tasks in this booklet during the summer to ensure you come, in September, properly prepared. Naturally, the harder you found the GCSE syllabus, the more time you are likely to need to put in. It is crucial you have a sound understanding and fluency on the following as you will regularly be using these skills:

Pure

Factorising/solving quadratics

Difference of two squares

Laws of indices

Fractional and negative indices

Surds

Inequalities

Graphs and transformation of graphs

Trigonometry

Simultaneous equations

Changing subject of formula

Algebraic fractions

Calculations with decimals/negatives/fractions

Gradients and equations of straight lines

Circle theorems

Statistics/Mechanics

Venn diagrams/set notation

Cumulative Frequency/Box plots

Interquartile range vs range

Averages from frequency tables

Probability

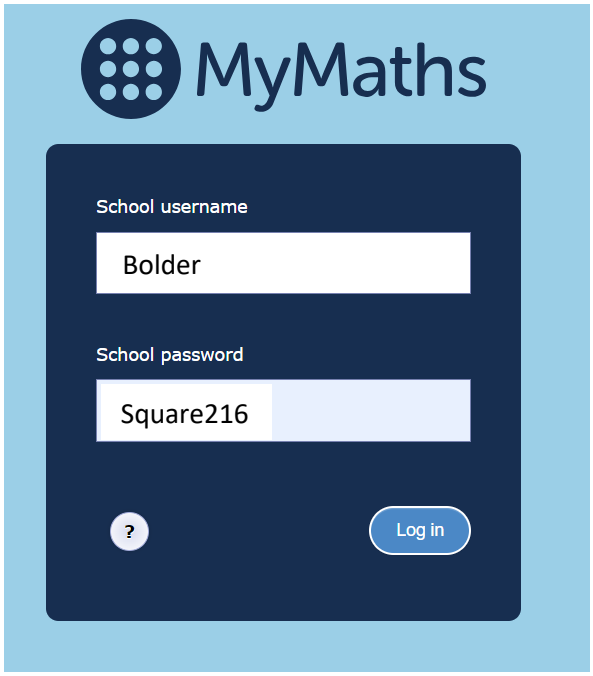
Sample space and tree diagrams

Histograms

Interpreting data

Commenting on results and trends

*Please refer to **MyMaths** to find the tasks that you need to complete. (individual logins to access the tasks will be emailed to you)*



Getting ahead!

The types of problems below promote critical thinking skills, and will make you apply knowledge, skills and mathematical techniques in unfamiliar ways in order to solve problems. If you are able to complete most of these questions you are demonstrating the correct levels of mathematical thinking, resilience and tenacity to embark successfully on you're a level mathematical journey. Show working out on a separate piece of paper.

1. When the expression $\dfrac{(2^2-1)\times(3^2-1)\times(4^2-1)\times(5^2-1)}{(2\times3)\times(3\times4)\times(4\times5)\times(5\times6)}$ is simplified, which of the following is obtained?

A $\frac{1}{2}$ B $\frac{1}{3}$ C $\frac{1}{4}$ D $\frac{1}{5}$ E $\frac{1}{6}$

2. What is the smallest prime which is the sum of five different primes?

A 39 B 41 C 43 D 47 E 53

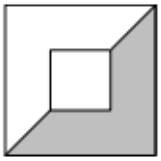
3. The figure shows a regular hexagon.

How many parallelograms are there in the figure?

A 2 B 4 C 6 D 8
E more than 8

4. The diagram shows two symmetrically placed squares with sides of length 2 and 5.

What is the ratio of the area of the small square to that of the shaded region?



A 7 : 24 B 1 : 3 C 8 : 25 D 8 : 21 E 2 : 5

5. What is the value of $\dfrac{1}{1.01}+\dfrac{1}{1.1}+\dfrac{1}{1}+\dfrac{1}{11}+\dfrac{1}{101}$?

A 2.9 B 2.99 C 3 D 3.01 E 3.1

6. What is the value of $\dfrac{4^{800}}{8^{400}}$?

A $\frac{1}{2^{400}}$ B $\frac{1}{2^{200}}$ C 1 D 2^{200} E 2^{400}

7. In 2021, a first class postage stamp cost 85p and a second class postage stamp cost 66p. In order to spend an exact number of pounds and to buy at least one of each type, what is the smallest total number of stamps that should be purchased?

A 10 B 8 C 7 D 5 E 2

8. In the diagram, the outer hexagon is regular and has an area of 216.

What is the shaded area?

A 108 B 96 C 90 D 84 E 72

9. A light-nanosecond is the distance that a photon can travel at the speed of light in one billionth of a second. The speed of light is 3×10^8 ms^{-1}.

How far is a light-nanosecond?

A 3 cm B 30 cm C 3 m D 30 m E 300 m

10. What is the value of x in the equation $\dfrac{1+2x+3x^2}{3+2x+x^2}=3$?

A -5 B -4 C -3 D -2 E -1

Film, Lecture & Podcast recommendations:

Films	Summary
	The Theory of Everything Stephen Hawking, an excellent astrophysics student working on his research, learns that he suffers from motor neurone disease and has around two years to live.
	Hidden Figures Three female African-American mathematicians play a pivotal role in astronaut John Glenn's launch into orbit. Meanwhile, they also have to deal with racial and gender discrimination at work.

TED Talks

How math is our real sixth sense

In this engaging talk, high school math teacher and YouTube star Eddie Woo shares his passion for mathematics, calling it an extra sense that we can all access. Using real-world examples of geometry, he encourages everyone to seek out the patterns around them for "a whole new way to see the world."

www.ted.com

https://www.ted.com/talks/eddie_woo_how_math_is_our_real_sixth_sense?language=en

Ideas for Day trips and things to do:

Below are some fantastic days out for all you maths lovers out there, this is **OPTIONAL**.

OBJECT GALLERY

MATHEMATICS: THE WINTON GALLERY