Maths Wrap
Real maths, tips and techniques

HOW TO GET
AN Ⓐ IN MATHS

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FOREWORD

Thank you for purchasing this book.

It's taken around 13 years to write - 12 years tutoring and 1 year imagining that I was the world's greatest author.

A good few weeks was spent on a daydream about being interviewed on national television...

That might not happen just yet, although I hope that you find some of the chapters useful ... and they help to get an A in maths. If they do please let me, and the national press, know!

All the very best with your studies.

WHERE TO START?

Charles Darwin: "A mathematician is a blind man in a dark room looking for a black cat which isn't there."

One of the difficulties with high school maths is that there seems so much to learn. Lots of formulas, methods, concepts and ideas. While it seems that other subjects are more straightforward, maths is the one area that can cause that 'love it / hate it' moment.

This book has been written to try to break through some of the barriers to achieving an A. There are a number of useful tips but, like all subjects, it's a great idea to start with what you know. The grade chart below is a sample of the type of questions that will be presented in most exams. It's not exhaustive but, as you work through, there should come a point where you begin to find the questions more difficult.

That's where you need to stop. The purpose of the exercise is to get an indication of your base level. This should help to form an idea of the kind of work you're going to need to do in the future. If you've got time... great, use all the ideas in the book and you should aim to get an A. If there is no time... great, at least you'll know the level of questions you need to focus on.

Don't worry too much about the questions you don't understand. Most of the maths, at this level, is just learning a technique and practising some examples. Looking at the A / A* questions can be a little daunting but it's all about the practice, sometimes learning the lingo.... but mainly the practice.
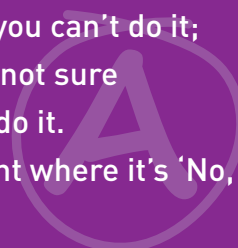
The whole point is that you need to know where to start. Don't feel that it's page 1 of 100. You might well be on page 20 already. So, as we start to look through some of the ideas to help you get an A, be encouraged. There's lots of help available, and feeling confident about what you already know is a great beginning.
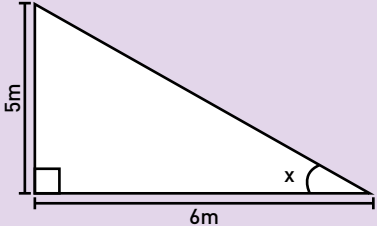
WHAT TO DO:

Work through the grade chart on the following pages, and for each question, write:
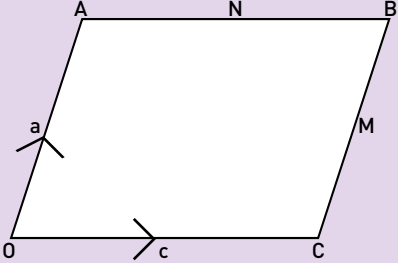**Yes** – if you're confident you can do it;
No – if you know you can't do it;
Maybe – if you're not sure whether you can do it.
If you reach a point where it's 'No, no, no': stop.

Grade	Sample Questions	What is being tested? How will I deal with this?	Yes / No / Maybe
E	401 – 267	Subtraction with regrouping	
E	35 of 65	Multiplying fractions	
E	These were the weekly wages, in pounds, of 10 workers at a factory: 40 40 35 140 45 140 55 50 35 140 Find the median and mode	Mean, median and mode. These questions occur frequently	
D	The normal price of a pair of shoes is £28. In a sale the price is reduced by 35%. What is the new price?	.. as do percentages	
D	Write 58% as a decimal		
D	The nth term of a sequence is given by the expression: $2n + 8$. Write down the first four terms of the sequence	Fairly straightforward but you need to know where to start (8 is the zero term)	
C	Solve $2x + 4 > 16$	Treat as a linear equation	
C	Write the ratio 360 : 900 as simply as possible	Treat as a fraction	
C	Find the highest common factor and lowest common multiple of 15 and 25	Use factor trees or short division	
B	AB is a line segment. A is the point (5, 2,-4). The midpoint M has coordinates (-1,-4, 2). Jim says that B has coordinates (2, -1, -1). Jim is wrong. Explain why	Be able to visualise and draw this onto a 3D grid	

Grade	Sample Questions	What is being tested? How will I deal with this?	Yes / No / Maybe
B	Calculate the size of angle x in the right angle triangle. Give your answer correct to 3 significant figures.	Knowledge of SOACAHTOA and inverse trigonometric ratios	
B	Solve $x^2 + 8x - 9 = 0$	Factorising and then checking	
A	Solve the simultaneous equations $2x + 3y = -3$ $3x - 2y = 28$	This can either be an algebraic or graphing solution	
A	A straight line has equation $2y - 6x = 5$ The point (k, 6) lies on the line. Find the value of k	Substitute x = k and y = 6 into the equation	
A	Write $\sqrt{45}$ in the form $k\sqrt{45}$ where k is an integer.	Square roots and square numbers	
A*	Two prisms, A and B, are mathematically similar. The volume of prism A is 12000 cm³. The volume of prism B is 49152 cm³. The total surface area of prism B is 9728 cm². Calculate the total surface area of prism A	The relationship between similar shapes is defined by a scale factor	
A*	Prove that the difference between the squares of any two consecutive odd numbers is always divisible by 4	Write down two odd integers in terms of n. Then set up the expression needed	

Grade	Sample Questions	What is being tested? How will I deal with this?	Yes / No / Maybe
A*	OABC is a parallelogram. M is the midpoint of BC. N is the midpoint of AB. (a) Find, in terms of a and / or c, the vectors $\overrightarrow{MB}$ and $\overrightarrow{MN}$	A vector has a magnitude (or size) and a direction.	

WHAT TO DO:

Now that you know your base level, you can set yourself a realistic target, in the time available, and plan what you need to work on to achieve your goal.

LOOK FOR THE 'TELLS'

Early maths, such as working with basic calculations like 2 + 3 = ? or 15 + 7 = ?, can be thought of as being quite easy. You write very little, and the answer is right or wrong. The difficulty comes when there is a two-step or three-step solution required. Add that to a 'word problem' and things can get a little complicated.

Unfortunately, maths isn't just about just calculating a solution. It's about *describing a situation*, and then *determining the outcome*. We use words to describe and then maths to solve.

When answering problem-solving questions you might need to:

- Choose which mathematical skill or technique to use
- Apply a technique in a different way
- Plan a strategy to solve a longer problem
- Show your working clearly and give reasons for your answers

Maths 'word problems' can be the stumbling block for students and it can be quite difficult to sort out the maths from the question. So the first chapter in this book deals with perhaps the most important point. **Read the question thoroughly**. Throughout this book there are some real practical ideas to encourage you to get an A in maths. But, the most important is to read the question.

That may be easier to write than to do. So, let's take a look at a couple of maths problems and a way of approaching them:

A typical grade D question:

I hope you have enjoyed reading the first chapter of 'How to get an A in maths.'

For more great practical tips and techniques please **click here**.