



Sir Roger Manwood's School

A Level Mathematics and Further Maths Preparation 2025

Successful study of two A Levels in Mathematics and Further Mathematics requires a high level of skill, confidence and enthusiasm topics covered in GCSE and in particular in Algebraic manipulation. It is therefore important that you do some preparation in advance so that you are ready and looking forward to your next challenge.

We have listed the topics on the next pages that we think are essentials. You need to know these topics thoroughly and to be able to apply your knowledge in these areas.

We have arranged for you to have access to the AMSP (Advanced Maths Support Programme) Transition to A Level Maths material. This is hosted on the Integral website (<https://my.integralmaths.org/login>). You should have been given your individual login details, but if you haven't got them, please contact us. We should like you to work through at least the Algebraic Manipulation section of the course, together with the Algebraic Manipulation assessment, and to print the certificate to show to us in September. If you do this work towards the end of the holiday, you will remember it better when you need it in September. The more you explore these resources the better prepared you will be for the pace of the course, and hopefully you will find them fun too!

There are some suggestions of other textbooks and resources that you might like to look at here. Use them if necessary so that you are confident that you can do all the necessary topics as listed on the next pages.

- 1) The rest of the AMSP Transition to A Level Maths material
- 2) AMSP Transition to A level Mathematics: Essential Skills resources
<https://amsp.org.uk/resource/gcse-alevel-transition-resources>.
- 3) On Kerboodle: Edexcel A Level Maths Year 1 + Year 2 Bridging Edition
- 4) MyMaths: A-level Bridging from GCSE. Use this link after you have logged into MyMaths or select the A Level (England) Curriculum and the Bridging from GCSE sections of Pure, Statistics and Mechanics <https://app.mymaths.co.uk/myportal/library/30/370/4490>
- 5) Your GCSE notes and revision guides
- 6) Books specifically written to bridge the gap between GCSE and A Level mathematics
e.g. Bridging GCSE and A Level maths Student Book (Collins) ISBN: 9780008205010
Head Start to AS Maths (CGP) ISBN: 9781782947929

Course Requirements

You will need a calculator and text books for your A Level Mathematics course. You can either buy these for yourself in advance, or buy them through school in September.

- 1) You need a calculator with the ability to access probabilities from standard statistical distributions.
The Casio fx-991CW is the calculator which we recommend and can order for you in September. The Casio fx-991EX is an older model; it has all the same functions and you might be able to find one at a reduced price.
The Casio fx-CG50, a graphical calculator, is also acceptable for use in the examinations, but is more expensive.
- 2) The text books required for year 12 are:
 - i) Edexcel AS & A-Level Mathematics Student Textbook - Pure Mathematics Year 1/AS + Online Edition ISBN: 9781789088397 Publisher: **CGP**
 - ii) Edexcel A-Level Mathematics Student Textbook - Pure Mathematics Year 2 + Online Edition ISBN: 9781789088410 Publisher: **CGP**
 - iii) Edexcel AS and A Level Mathematics Student textbook -Statistics & Mechanics Year 1/AS + online ISBN: 9781789088403 Publisher: **CGP**
 - iv) Edexcel A level Mathematics Student Textbook - Statistics & Mechanics Year 2 ISBN: 9781789088427 Publisher: **CGP**
 - v) Edexcel AS and A level Further Mathematics Core Pure Mathematics Book 1/AS Textbook + e-book ISBN:9781292183336 Publisher: **Pearson Education Limited**

Pre-requisites for studying A Level Mathematics

- 1) Know and be able to use the laws of indices

$$x^a \times x^b = x^{a+b} \quad \frac{x^a}{x^b} = x^{a-b} \quad (x^a)^b = x^{ab}$$
$$x^0 = 1 \quad x^{-a} = \frac{1}{x^a} \quad x^{\frac{1}{a}} = \sqrt[a]{x} \quad x^{\frac{b}{a}} = \sqrt[a]{x^b}$$

- 2) Expand brackets and factorise quadratic expressions

e.g.

$$(x+3)(2x-5) \equiv 2x^2 + x - 15 \quad (x+2)(x+2) \equiv x^2 - 4$$
$$x^2 + 7x + 12 \equiv (x+3)(x+4) \quad x^2 - 9 \equiv (x-3)(x+3) \quad 2x^2 - 9x - 18 \equiv (2x+3)(x-6)$$

- 3) Use surd form and rationalise the denominator of a fraction

$$\sqrt{8} = 2\sqrt{2}$$
$$\frac{1}{3-\sqrt{2}} = \frac{1}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}}$$
$$= \frac{3+\sqrt{2}}{9-2}$$
$$= \frac{(3+\sqrt{2})}{7}$$

e.g

4) Solve simultaneous equations

- a) both equations linear
- b) one equation linear and one quadratic

$$4x + 6y = -4$$

e.g. solve: $4x^2 - 2y^2 = -1$

5) Find an equation of the line passing through two given points

e.g. Find the equation of the line through (3,4) and (6,-7)

6) Be able to transform graphs

Given a sketch of the graph of $y = f(x)$, sketch $y = f(x) + c$, $y = f(x + c)$, $y = cf(x)$, $y = f(cx)$, $y = -f(x)$ and $y = f(-x)$ for a constant, c .

7) Completing the square

e.g.

$$\begin{aligned} x^2 + 8x - 12 &\equiv (x + 4)^2 - 16 - 12 \\ &\equiv (x + 4)^2 - 28 \end{aligned}$$

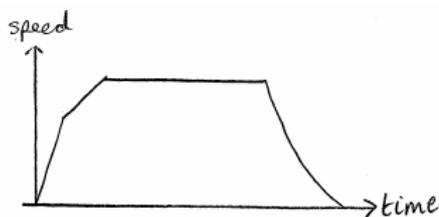
8) Add algebraic fractions

e.g.

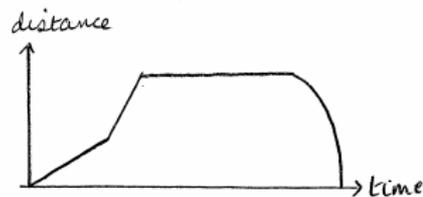
$$\begin{aligned} \frac{2}{x-3} - \frac{1}{2x+3} &\equiv \frac{2(2x+3)}{(x-3)(2x+3)} - \frac{(x-3)}{(x-3)(2x+3)} \\ &\equiv \frac{(4x+6) - (x-3)}{(x-3)(2x+3)} \\ &\equiv \frac{4x+6-x+3}{(x-3)(2x+3)} \\ &\equiv \frac{3x+9}{(x-3)(2x+3)} \end{aligned}$$

9) Know the properties of simple velocity/time, speed/time and distance/time graphs

e.g.



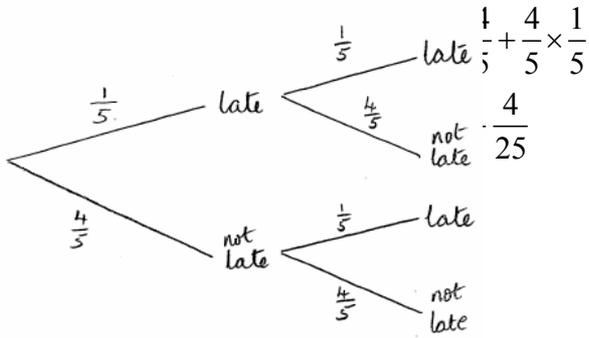
acceleration and
area represents distance travelled



Gradient represents velocity

Gradient
represents

10) Use tree diagrams to calculate probabilities

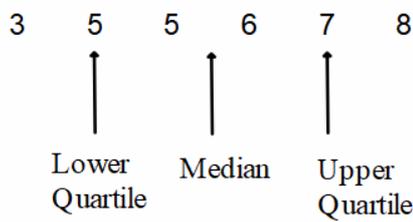


11) Calculate the mean of a set of grouped data

e.g. Find the mean value of x from this table

| x | Frequency |
|------------------|-----------|
| $0 \leq x < 5$ | 3 |
| $5 \leq x < 10$ | 6 |
| $10 \leq x < 15$ | 2 |

12) Find median, quartiles and interquartile range for ungrouped data



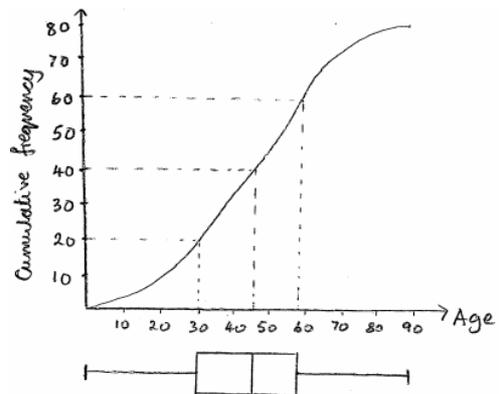
Median = 6.5

Interquartile range = $7 - 5 = 2$

13) Cumulative frequency graphs and box and whisker plots

Use a cumulative frequency graph to estimate median and quartiles of a set of grouped data

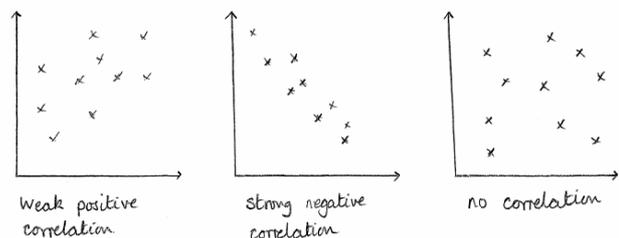
Draw box and whisker plots and understand their use in comparing sets of data



14) Scatter diagrams

Plot a scatter diagram and draw a line of best fit by eye and recognise:

strong/weak/no/positive/negative correlation



15) Histograms

Know that the frequency is proportional to the area of the bar