Maths and Further Maths A-Level Summer Homework

Ashlawn School (Summer 2022)

Well done for choosing to take A-Level Maths (and Further Maths) – we're looking forward to seeing you in September! The document that follows details a few things you need to know before you join us, as well as some Maths work that you will need to complete before the start of term in September.

To study A-Level Maths you will need a calculator with some extra functionality, the one we recommend is the Casio Classwiz FX991-Ex (it should be black and silver with a white cover – be careful not to get the GCSE one). These can be ordered from the school library in September – order forms will be available from Mrs Mills. If you are eligible for financial support to purchase the calculator then please get in touch.

If you have any questions about the following work or A-Level Maths or Further Maths in general then please contact: atkark@ashlawn.org.uk (Mr Atkar - KS5 Coordinator) / moranl@ashlawn.org.uk (Miss Moran – Head of Maths)

If you are struggling with a question, or do not know how to do it, then you are expected to use one or more of the websites on this page to help you. We are expecting you to use your initiative and practise being independent learners.

- Corbett Maths
  - https://corbettmaths.com/contents/
  - Use CTRL+F to then search for the topic you need help on. Watch the help videos and then complete the worksheets for extra practise.

- Hegarty Maths
  - https://hegartymaths.com/
  - Ashlawn students will already have login details, you can access helpful videos on key topics and a pre-A-level transition course is at the end of this document.

Summer work

Essential Skills Transition work:

You will need to set up an account with AMSP (see next page for how to do this).

One of the most popular choices at A level is Mathematics; however, the transition from GCSE to A level remains a challenge for many students.

The Essential skills transition materials have been designed by the Advanced Mathematics Support Programme (AMSP) for students to work through and complete independently. Completion of these GCSE to AS/A level transition resources will help you to develop fluency in the fundamental techniques and the key mathematical concepts that underpin A level Mathematics.

It is therefore vitally important that you are fluent and confident in applying these essential skills, so that you can be successful in making the transition to the academic standard required at A level.

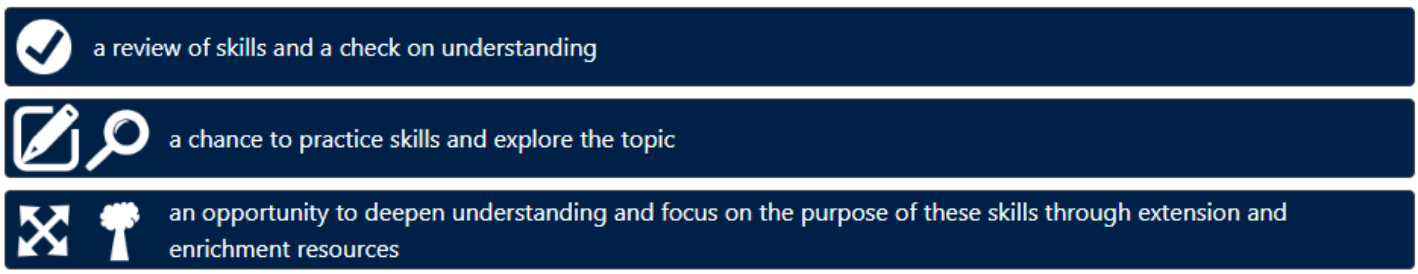
Review, recall, and consolidation are important factors in the transition process, and overarching skills that are transferable across key topics are vital to developing a depth of understanding. Consequently, these resources focus on the following essential skills from the Higher tier GCSE curriculum and how they are applied across a number of key topics at AS and A level.

There are sets of resources for the following areas of mathematics:

- **Integers**
- **Geometry**
- **Surds and Indices**
- **Coordinate geometry**
- **Algebraic manipulation**
- **Trigonometry**
- **Completing the square**

Each set should provide about 3 hours of work. If you really get engaged by the enrichment activities, you may want to spend longer than this. Each set also includes either written worked solutions, video solutions or links to websites.

Each of the areas contains:



How it is designed to be used

The course is designed for you to work through by yourselves without input from a teacher over the Summer between Years 11 and 12. You can continue to access the resources and work through the topics for support at the start of Year 12. Each of the seven topics is structured in the following way:

- Chapters containing videos and activities
- An assessment – scores will appear on a certificate of completion
- Going deeper – optional material to give students a head-start at A level

How to access it

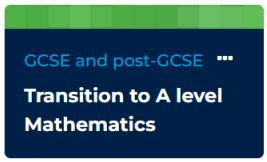
This course is totally free and is hosted by Integral. It requires an individual login to gain access and to allow progress to be tracked.

To set up an account, you will need to register.

To register using the following link: Students can register themselves.

Click here to register for your free account.

Once registered, follow the prompts on the home screen, clicking on the following course:



Assessment and Certification

It is really important that you do not attempt the assessment for each area until you have worked through the various resources and are absolutely confident with the content.

You will get one chance only with each assessment.
Do not attempt it until you have completed the activities for that area.

Once you have completed the assessment, you will be able to print off / download a certificate of completion which will also have your score on it. You will need to bring all seven certificates to your first/second lesson in September. If you are not able to print your certificates at home, then email them to your teachers so that they can check that you have successfully completed the work. Your teachers will let you have their email details during the first lesson in September.

Further work (optional)

The next few pages contain the Hegarty Maths pre-A-Level Transition course. We strongly recommend that you also use Hegarty Maths to help retain the core knowledge you have learnt at GCSE.

If you don't have access to Hegarty Maths then you can use the topic list as a guide and work on these topics via Corbett Maths.

Hegarty Maths Transition Course

As you transition from Year 11 to Year 12, it is very important to refresh your memory on certain core mathematical skills. Moreover, it is vital that you have a sound understanding of some more difficult skills. In the tables below, you will find **180 skills** that you should be confident with as you start Year 12. Get 100% on each and use the videos if you are stuck.

Number

Topics	Clip Number	R	A	G
Indices, powers & roots				
Index form 1 (intro)	102			
Index form 2 (power of 0 & 1)	103			
Index form 3 (power of negative integers)	104			
Index form 4 (multiplying indices)	105			
Index form 5 (dividing indices)	106			
Index form 6 (power of power rule)	107			
Index form 7 (powers of unit fractions)	108			
Index form 8 (powers of non-unit fractions)	109			
Index form 9 (combination of rules)	110			
Multiplication & division with surds 1	113			
Multiplication & division with surds 2	114			
Simplifying surds	115			
Brackets involving surds 1	116			
Brackets involving surds 2	117			
Rationalising surds 1	118			
Rationalising surds 2	119			
Order of operations 3 (indices & roots)	120			

Algebra

Topics	Clip Number	R	A	G
Substitution				
Substitution 1	780			
Substitution 2	781			
Substitution 3	782			
Substitution 4	783			
Substitution 5	784			
Substitution 6	785			
Substitution 7	786			
Substitution 8	787			
Substitution (Equations of motion 1)	788			
Substitution (Equations of motion 2)	789			

Algebra (continued)

Topics	Clip Number	R	A	G
Manipulating expressions				
Collecting like terms 2	157			
Simplifying expressions involving multiplication	158			
Simplifying expressions involving division	159			
Expand two single brackets & simplify	161			
Expand double brackets 1	162			
Expand double brackets 2	163			
Expand double brackets 3	164			
Expand brackets (difference of two squares)	165			
Expand triple brackets	166			
HCF of algebraic expressions	167			
Factorise simple expressions 1	168			
Factorise simple expressions 2	169			
Simplifying expressions by factorising 1	170			
Simplifying expressions by factorising 2	171			
Expressions with algebraic fractions	172			
Indices with algebraic expressions 1	173			
Indices with algebraic expressions 2	174			
Indices with algebraic expressions 3	175			
Linear equations				
Solve 1 step equations (balance method)	178			
Solve 2 step equations (involving multiplication)	179			
Solve 2 step equations (involving division)	180			
Solve 2 step equations (x on denominator)	181			
Solve 2 step equations (x negative)	182			
Solve 3 step equations	183			
Solve equations with x on both sides 1	184			
Solve equations with x on both sides 2	185			
Solve equations with x on both sides 3	186			
Solve equations with algebraic fractions	187			
Setup & solve equations (in context)	188			
Simultaneous equations by elimination 4	193			
Simultaneous equations by substitution	194			
Simultaneous equations (in context)	195			
Linear sequences and graphs				
Midpoint of a line segment	200			
Gradient of a line segment 1	201			
Gradient of a line segment 2 (negative)	202			
Gradient of a line segment 3 (fractions)	203			
Gradient of a line segment 4 (summary)	204			
Straight line graphs 1	206			
Straight line graphs 2	207			
Straight line graphs 3	208			
Straight line graphs 4	209			

Algebra (continued)

Topics	Clip Number	R	A	G
Linear sequences and graphs (continued)				
Straight line graphs 5	210			
Straight line graphs 6	211			
Straight line graphs 7	212			
Straight line graphs 8	213			
Straight line graphs (parallel)	214			
Straight line graphs (perpendicular) 1	215			
Straight line graphs (perpendicular) 2	216			
Straight line graphs (alternative way to define)	220			
Solving equations & straight lines	217			
Solving simultaneous equations using straight lines 1	218			
Solving simultaneous equations using straight lines 2	219			
Quadratics				
Factorise quadratic expressions 1	223			
Factorise quadratic expressions 2	224			
Factorise quadratic expressions 3	225			
Factorise quadratic expressions 4	226			
Factorise quadratic expressions 5	227			
Factorise quadratic expressions 6	228			
Simplify algebraic fractions (involving quadratics)	229			
Completing the square 1	235			
Completing the square 2	236			
Completing the square 3	237			
Using the discriminant	243			
Solving quadratic equations 1 (by factorising)	230			
Solving quadratic equations 2 (by factorising)	231			
Solving quadratic equations 3 (by factorising)	232			
Solving quadratic equations 4 (by factorising)	233			
Solving quadratic equations 5 (inverse operations)	234			
Solving by completing the square 1	238			
Solving by completing the square 2	239			
Solving using the quadratic formula 1	241			
Solving using the quadratic formula 2	242			
Quadratic equations from algebraic fractions	244			
Quadratic equations in context	245			
Simultaneous equations involving quadratics	246			
Find the y-intercept of a quadratic graph	252			
Find the x-intercept (roots) of a quadratic graph	253			
Find the line of symmetry of a quadratic graph	254			
Find the turning point of quadratic graphs 1	255			
Find the turning point of quadratic graphs 2	256			
Sketch a fully labelled quadratic graph	257			
The discriminant & quadratic graphs	258			
Simultaneous equations using graphs (quadratic & linear)	259			
Using a quadratic graph to solve a related quadratic equation	260			

Algebra (continued)

Topics	Clip Number	R	A	G
Exponentials				
Manipulating powers 1	790			
Manipulating powers 2	791			
Manipulating powers 3	792			
Manipulating powers 4	793			
Manipulating powers 5	794			
Manipulating powers 6	795			
Exponential equations 1	796			
Exponential equations 2	797			
Exponential equations 3	798			
Harder exponential problems	799			
Exponential graphs (drawing)	302			
Exponential growth graphs	800			
Exponential decay graphs	801			
Points on exponential graphs 1	802			
Points on exponential graphs 2	803			
Real life exponential growth 1	804			
Real life exponential growth 2	805			
Real life exponential growth 3	806			
Real life exponential growth 4	807			
Real life exponential decay 1	808			
Real life exponential decay 2	809			
Real life exponential decay 3	810			
Real life exponential decay 4	811			
Circles				
Equation of a circle – centre origin 1	778			
Equation of a circle – centre origin 1	779			
Equation of a circle 1 (find centre and radius)	314			
Equation of a circle 2 (write equation)	315			
Equation of a circle 3 (location of points)	316			
Equation of a circle 4 (not standard form)	317			
Inequalities				
Integer solutions to inequalities	267			
Multiple inequalities on a number line	268			
Solve single linear inequalities 1 (positive x)	269			
Solve single linear inequalities 2 (negative x)	270			
Solve single linear inequalities 3 (difficult)	271			
Linear inequalities as graph regions 1	273			
Linear inequalities as graph regions 2	274			
Linear inequalities as graph regions 3	275			
Linear inequalities as graph regions 4	276			
Solving quadratic inequalities	277			

Algebra (continued)

Topics	Clip Number	R	A	G
Formulae				
Change the subject of the formula 1 (1 step)	280			
Change the subject of the formula 2 (2 step)	281			
Change the subject of the formula 3 (negative x)	282			
Change the subject of the formula 4 (x on denominator)	283			
Change the subject of the formula 5 (x with powers)	284			
Change the subject of the formula 6 (x on both sides)	285			
Change the subject of the formula 7 (x on both sides/denominator)	286			
Important graphs				
Cubic graphs (recognising)	299			
Reciprocal graphs 1	300			
Reciprocal graphs 2	301			
Sine graph	303			
Cosine graph	304			
Tangent graph	305			
Sine, cosine, tangent summary	306			
Graph transformations				
Graph transformations 1 f(x)±a	307			
Graph transformations 2 f(x±a)	308			
Graph transformations 3 af(x)	309			
Graph transformations 4 f(ax)	310			
Graph transformations 5 f(x)	311			
Graph transformations 6 f(x)	312			
Graph transformations 7 (combined)	313			

Geometry and measures

Topics	Clip Number	R	A	G
Non-calculator trigonometry 1	845			
Non-calculator trigonometry 2	846			
Non-calculator trigonometry 3	847			
Non-calculator trigonometry 4	848			
Non-calculator trigonometry 5	849			
Non-calculator trigonometry 6	850			
Non-calculator trigonometry 7	851			
Non-calculator trigonometry (Problem solving 1)	852			
Non-calculator trigonometry (Problem solving 2)	853			