**Preparing to succeed in**

**A-level Maths**

**College Preparation Work**

**Name:**

Welcome to college and to the Mathematics Department.

You will now have a long break from school and may well find that you get rather rusty at some of the maths skills which you spent so long learning at school.

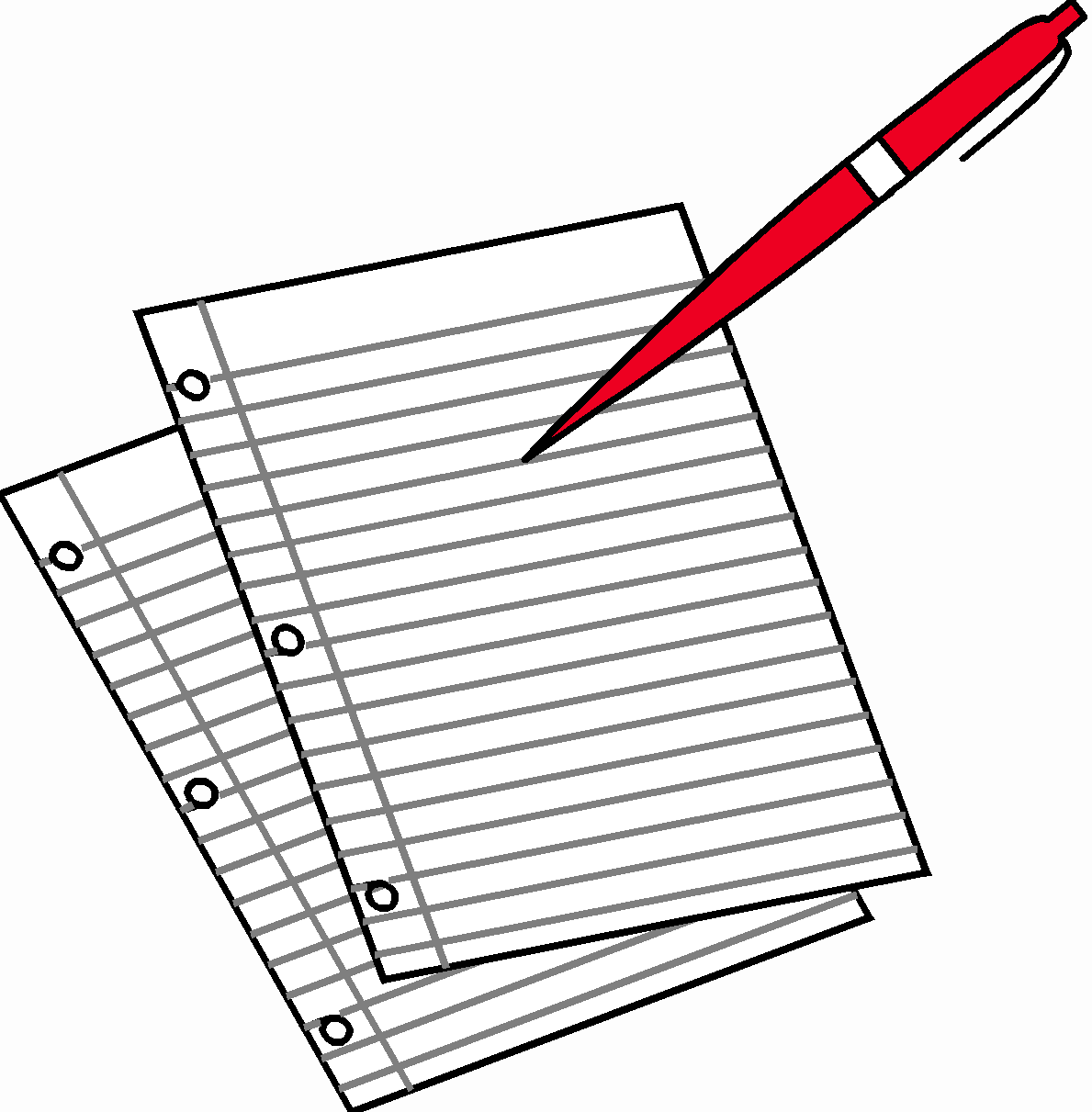
This booklet contains some of those key ideas from GCSE which will help you to make a good start on the A-level course. Please work through this booklet over the next few weeks to keep your skills up to speed.

The step up from GCSE to A-Level is a big leap. There are additional resources available to practice essential maths skills on the “summer homework” section of our college website – please do these for extra practice.

Read through the examples for each topic and have a go at the questions in each bold section. Please make a good attempt at every question - we’d rather it was wrong than blank as it helps us to see where you may need some help! It’s fine to look things up in your old books, or look at websites like BBC GCSE Bitesize to get some help if you need it.

Please set out all your working carefully and **try not to use a calculator** for any of these questions – algebraic skills are tested in the exams.

**Preparing for lessons in September – please bring:**

* A4 file paper (lined not squared is preferable)
* A ring binder folder with some file dividers
* Pens and pencils
* Highlighter pens
* This booklet to hand in!

The following words or phrases are commonly used in A-level maths – how many do you recognise? Please jot down a brief definition of each term – look them up if you’re not sure…

|  |  |
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|  | **Definition** |
| Integer |  |
| Rational number |  |
| Numerator |  |
| Denominator |  |
| Irrational number |  |
| Reciprocal |  |
| Surd |  |
| Polynomial |  |
| Quadratic |  |
| Linear |  |
| Coefficient |  |
| Gradient |  |
| Parallel |  |
| Perpendicular |  |
| Tangent |  |
| The Subject of an equation |  |

**Algebra – Substituting values, Expanding brackets & Collecting terms**

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| **Substitution**: If find the values of the following expressions: |
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| **Expanding & Simplifying Examples**  Take care with ± signs  Remember to multiply every term in the first bracket with every term in the second! [Sometimes known as FOIL]  Multiplication before subtraction (BIDMAS) |

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| **Try the following:** |
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**Algebra - Solving and Rearranging Equations**

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| **Examples:**  Subtract 7 from each side  Divide each side by 3.  You don’t need to say what you’re doing each time – this is just here to remind you! | Notice that the working is set out with one line below another.  Don’t write things like this:  You may finish in the right place but this lengthy list of = signs doesn’t make sense! |
| Solve to find the value of *a*:        We prefer fractions – don’t change to decimals | Rearrange to make *c* the subject: |
| Rearrange to make *b* the subject:    Remember to use ± for square roots |  |

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| **Solve the following:** |  |
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| **Rearrange the following formulae:** |  |
| Make the subject: |  |
| Make the subject: |  |
| Make the subject: |  |
| Make the subject: |  |

**Algebra – Factorising**

**Examples:**

Look for common factors (numbers or letters) to take out first…

Quadratic expressions – look for numbers which multiply to make the constant term and add up to give the term.

So choose +9 and -3 for the factors

Multiply to make -27

So choose -2 and -3 for the factors

Add to make +6

Add to make -5

Multiply to make +6

Sometimes do both…

Then factorise the quadratic

Common factors first

**Factorise the following:**

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**Algebraic Fractions**

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| **Rules :**  You can add or subtract fractions if they have a common denominator.  Multiply by multiplying the numerators and multiplying the denominators.  Dividing by a fraction is the same as multiplying by the reciprocal (turn it over!)  Don’t forget to cancel fractions into their simplest possible form even when algebraic.  If unsure try a numerical version and use the same method for algebra. |

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| **Examples:** |  |
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**Solving Quadratics**

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| You can solve quadratic equations in the form  by   * Factorising      * Completing the square      * Using the Quadratic Formula |

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| Solve by factorising |
| Solve by completing the square |
| Solve By Using The Quadratic Formula |

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| **Pythagoras**  5cm  *x*  12cm |  | **Find the value of *x***  10cm  6cm  *x* |

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| **Extensions**: (Optional – have a go at these if you found the other sections straightforward. If you’re taking Further Maths you should definitely try this!)    2cm  4cm  The diagram shows a triangle in a semi-circle.  Work out the perimeter of the semi-circle giving  your answer as an exact form involving and .  (no calculator / decimals) |

Find the area of the right-angled triangle below. As an extra extension, leave your answer in surd form.

2*x* – 3

2*x* + 3

*x* + 1