Year 9 Maths Study Guide

Ideas to help you achieve your best in maths

2015 (Semester 2) Edition
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Introduction

Learning Mathematics in Australia is not only fundamental for our daily lives but also ensures that our students excel in their chosen life after school careers. *The Australian Curriculum: Mathematics provides students with essential mathematical skills and knowledge in Number and Algebra, Measurement and Geometry, and Statistics and Probability*.

The Australian Curriculum has been designed to ensure that all students:

- are able to link and relate real-life situations/scenarios to skills and knowledge obtained ensuring that they are creative and confident
- acquire a fluent understanding of all concepts and processes learnt in order to find solutions in all areas: Number and Algebra, Measurement and Geometry and Statistics and Probability
- comprehend and are able to make connections with other subject areas strengthening their appreciation for the Mathematics discipline

Purpose

The purpose of this document is to help Year 9 Mathematics students develop independent learning skills and home study plans. We aim to help all students develop a positive attitude towards their mathematics allowing each child a chance to accomplish a sense of achievement and success.

We hope to encourage all Year 9 students to develop an independent study routine ensuring they are keeping on top of their studies as well as extending themselves mathematically.

We encourage students to take active responsibility for their home study throughout each unit of study with consideration given to the following proficiency strands:

1. **Understanding**: knowledge obtained previously will help establish whether students are able to establish a link connecting the ‘why’ and ‘how’ of mathematical concepts
2. **Fluency**: the development of skills, knowledge and concepts helping carry out procedures and methods where answering problems
3. **Problem Solving**: modelling is used here to link the skills obtained with real-life scenarios
4. **Reasoning**: the development of solutions to sophisticated situations.

These proficiency strands, which underpin the Australian Curriculum, are designed as a set of ‘stepping stones’ towards mathematical proficiency and understanding for each unit studied.
Part 1 - Getting Organised

Organisation is a fundamental skill that is a challenge for many students.

Maths requires a high level of organisation – from having the correct equipment in class or at home, to organising mathematical ideas in your brain and communicating your thinking on paper (to an examiner)!

Don’t quit at the first hurdle! Here are some tips for getting organised now, before it’s too late!

**Equipment**

Here is a list of the equipment you will need in class and at home when you are studying for tests and exams.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workbook:</strong> where all worked calculations and solutions are recorded. This workbook is to be kept neat and tidy at all times. Under <strong>no circumstances</strong> are students permitted to tear pages out of their workbooks.</td>
<td>1</td>
</tr>
<tr>
<td><strong>Folio book:</strong> where notes and worked examples taken in class are recorded. Students are to ensure that this is kept up to date – if a student is absent from class it is his or her responsibility to catch up.</td>
<td>2</td>
</tr>
<tr>
<td><strong>Textbook:</strong> The textbook is required to ensure that students are able to complete the assigned problems. The textbook should also be used as a resource to obtain worked examples as well as consolidate classroom based learning.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Calculator (Scientific):</strong> ensures that students are able to proceed with most mathematical worked solutions. Practice with the calculator also ensures that students are familiar with adjusting certain settings for certain units/topics studied. Teachers will <strong>not</strong> be able to assist with adjusting or showing how to work the calculator in a test or examination.</td>
<td>4</td>
</tr>
<tr>
<td><strong>Writing Materials:</strong> correct materials are used to guarantee that the workbook is kept presentable. The ruler should be used to rule margins and for all graphing. Graphing should <strong>always</strong> be done using a lead pencil.</td>
<td>5</td>
</tr>
<tr>
<td><strong>HOTMaths:</strong> this web-based software is linked to the Essential Maths textbook and contains a wide range of tools and resources to assist students with their learning.</td>
<td>6</td>
</tr>
<tr>
<td><strong>Student Diary (or alternative):</strong> will help keep track of tasks, questions and assignments that need to be completed.</td>
<td>7</td>
</tr>
</tbody>
</table>
Maintaining a Mathematics Workbook and a Folio Book

It is vital that you take pride in your work.

Some students very easily fall into the trap of leaving blank pages between exercises, tearing out messy pages (causing their exercise book to fall apart) and scribbling out work.

Instead you should set up your exercise book in a neat and well-ordered manner.

In preparation for senior studies in Maths, it’s a good idea to rule margins on every page.

Another option is to include a centre margin, splitting the page into two columns.

<table>
<thead>
<tr>
<th>Exercise book with two (2) columns</th>
<th>Exercise book with no columns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q1</strong> [ \frac{x}{4} = \frac{18}{6} ] [ \therefore x = 12 ] [ \checkmark ]</td>
<td><strong>Q1</strong> [ \frac{x}{12} = \frac{6}{9} ] [ \therefore x = 8 ] [ \checkmark ]</td>
</tr>
<tr>
<td><strong>Q2</strong> [ \frac{x}{90} = \frac{40}{50} ] [ \therefore x = 54 ] [ \checkmark ]</td>
<td><strong>Q2</strong> [ \frac{x}{10} = \frac{14}{9} \times 10 ] [ \therefore x = 8 ] [ \checkmark ]</td>
</tr>
<tr>
<td><strong>Q3</strong> [ \frac{x}{12} = \frac{6}{9} \times 12 ] [ \therefore x = 8 ] [ \checkmark ]</td>
<td><strong>Q3</strong> [ \frac{x}{15} = \frac{14}{9} ] [ \therefore x = \frac{15}{9} ] [ \checkmark ]</td>
</tr>
</tbody>
</table>

Maintaining a Folio of Class notes – check for understanding

It is important to copy down board notes into your Folio book. It is your responsibility to make sure that your Folio of class notes is up to date so if you miss a class, be sure to ask a friend or the teacher for the notes you have missed.

After you have copied down/written or summarised class notes, read over what you have written to make sure you understand.

If you don’t understand, make sure that you follow up with your teacher, ask questions and ask for help.

Even if you do understand the notes, add diagrams, colour (highlighting) and side notes to help you remember what it all means when you come back to later when studying for tests and exams.

Also, if during the course of a unit your teacher helps you with an area of maths that you had difficulty with or couldn’t remember from previous years, add notes about this into your folio as well. Make your folio individual to your needs. It is your reference material that you can come back to again and again.

Some students keep their folios from previous years to assist them in future years of study because the notes are so good and provide such a helpful reference. Make yours that good!

Reflection Page

Leave a page after each topic to reflect on the test, how you studied - what worked and what didn’t.

Include information you could have done with on test day that was not in your folio. Make detailed folio notes and make sure you understand any material you didn’t know well enough for the test.

This type of reflection will contribute to your exam preparation.
Completing class work
It is also your responsibility to ensure that all text-book based questions and other tasks set by your teacher are complete and understood.

When working through the text book exercise students are encouraged to complete a range of questions from the four proficiency strands: Understanding, Fluency, Problem Solving and Reasoning. These are labelled within each exercise in the text book.

Finally, enrichment tasks can be used as extension questions for those willing to extend their learning.
**Do I have to show my working out?**

Students often ask whether they are required to show their working out. Let’s answer that question once and for all...

**You must always show working out before writing down your answer to any problem in maths!**

By year 9, you have hopefully developed skills in showing your working out but if not, ask your teacher for help to understand what is required.

Showing working out is important because:

- It communicates your thinking to your teacher and/or the person marking the examination;
- The method you have used to solve the problem is significantly more important than the answer itself (the right answer is still important but how you found it is critical!);
- If you make a slight error in your calculations, it is not the end of the world because the examiner can still see how well you have done with the rest of the problem solving and can allocate a decent number of marks to you!
- Showing working out can mean the difference between passing and failing a test or exam!

Showing working out includes:

- Writing out the equation or a brief summary of the problem;
- Showing step by step the calculations you are performing as you solve the problem;
- Drawing neat diagrams;
- Using pencils and rulers for all diagrams;
- Using the equals sign accurately;
- Setting out problems and communicating your thinking.

Students must set out all calculations in a clear and concise manner. An example (to compare):

<table>
<thead>
<tr>
<th>Correct set-out</th>
<th>Incorrect set-out</th>
</tr>
</thead>
</table>

**Example:** Find the value of the pronumeral. Express your answer correct to two decimal places.

![Diagram](image1)

Label your diagram:

\[ \begin{align*}
  &\quad 12 \\
  4 &\quad a
\end{align*} \]

Write out the formula you need to use (where applicable):

\[ c^2 = a^2 + b^2 \]
\[ a^2 = c^2 - b^2 \]

Substitute in the values then calculate:

\[ a^2 = (12)^2 - (4)^2 \]
\[ a^2 = 144 - 16 \]
\[ a = \sqrt{128} = 11.3137 \]

Write your answer to two decimal places:

\[ a = 11.31 \text{ (units)} \]

**Example:** Find the value of the pronumeral. Express your answer correct to two decimal places.

![Diagram](image2)

Most students will skip important steps:

\[ a^2 = c^2 + b^2 \quad \times \]
\[ a^2 = 144 + 16 \]
\[ a = 128 \quad \times \]

Firstly, the equation wasn’t written down correctly resulting with a poor start.

It shows that the student has attempted to solve the problem using the calculator and not working through the correct process.
Ask for Help! (Avoid a meltdown!)

Don’t leave it too late to ask for help if you are having difficulty understanding the work!

A week before the exam is not the right time to tell the teacher or Mum and Dad that you don’t understand.

You can correct your own work as you complete the set tasks to ensure you have the right mathematical procedures in place.

Incorrect work can be caused by lack of understanding or misconceptions or you may understand the work but for some reason are doing it wrong!

To correct these errors, it is crucial that you find out why you are getting it wrong!

Teachers are there to help and will check students’ work periodically and provide feedback, correction and further explanations.

However, it is your responsibility to ask for help if you find a problematic area in the course of your studies.

If you are unable to resolve the difficulties you are having, get some help from your teacher as soon as possible.
**Part 2 - Home Study**

It is up to you to develop study plans and techniques that enable you to perform at your best throughout Year 9 and future years.

The suggestions here include practical activities that you can undertake to manage your studies.

It is important that you realise that you are ultimately responsible for investing time and effort into developing and fulfilling your own personal study plan.

- The first step you can take is to make sure you have a nice, peaceful place to study.
- It helps if you have a desk of your own, where you can leave your things out and when you come back to them, no one has touched or moved anything.
- Place inspirational quotes, prayers or images above your desk to keep you motivated.
- Turn off distractions such as Facebook or other social media.
- Some people work well with music, others need complete silence….work out what works for you.
- Focus on achieving your personal best and don’t worry about what other people are up to.
- Isolate some time in your schedule to focus on your maths.
- Go for it!

**How’s your Growth Mindset?**

> “Growth mindset is an approach to understanding our brains and their capabilities that has been promoted by Stanford University Professor, Carol Dweck. Dweck notes that the more that we understand our brain’s capabilities, and see our intelligence, talents and relationships as always open to improvement, we can tap into a significant potential for growth.”

(Kate Fogarty, ACK Bulletin, 5th February 2015)

You can get better at maths.

Here are some suggestions of what you can do that might work for you:

- Spend some time each week, reviewing the work covered in class. Make sure you understand the concepts and if you don’t understand, make a note to ask for help from your teacher or mentor.
- Practice and challenge yourself. Try the enrichment tasks! If you get stuck, look for clues, ask for help or find out what it is you don’t know yet that will help you to solve the problem.
- Don’t be embarrassed if you make a mistake. Find out why. If you can’t figure it out for yourself, ask someone for help.
- Help another student. Explaining maths to other students is a sure fire way to get better at maths yourself.
- Support each other. Encourage other students to try hard as well. That way we generate a culture of learning and trying that makes studying a better experience for all of us.

**ACK Libguides**

The Maths Libguide is now available and contains a wide range of video tutorials on various mathematical concepts and procedures.

The content is organised by year level and topic but don’t be afraid to check out the year 7 and 8 tabs if you realise you might have missed something from earlier years of study.

Check out the libguide and just explore what is on offer. You never know what tips you might pick up.
**HOTMaths**

HOTMaths can be a useful tool to help consolidate skills and understanding from the class work.

If you have the internet at home, you can access HOTMaths in your own time and work through extra problems that are linked to the text book work.

Students in Year 9 have access to HOTMaths using their unique login and password details. The web-based software corresponds to the Essential Maths text book.

Teachers may set work for students to complete.

There are also a wide range of fact sheets and interactives that students can access to help consolidate key ideas and understand concepts.

**Don’t forget what we’ve studied**

The following timeline provides a brief outline of the topics covered in Year 9 Maths in 2015. Your teacher will provide more detail as the year progresses.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Units</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. Proportional Reasoning</td>
<td>Test</td>
</tr>
<tr>
<td></td>
<td>2. Probability</td>
<td>Modelling Task</td>
</tr>
<tr>
<td></td>
<td>3. Financial Maths</td>
<td>Application Task</td>
</tr>
<tr>
<td></td>
<td><strong>--End of Semester 1--</strong></td>
<td>Examination of Semester 1 topics 1 – 3</td>
</tr>
<tr>
<td>2</td>
<td>1. Index Laws</td>
<td>Test</td>
</tr>
<tr>
<td></td>
<td>2. Measurement</td>
<td>Extended Application and Test</td>
</tr>
<tr>
<td></td>
<td>3. Pythagoras’ Theorem</td>
<td>Test</td>
</tr>
<tr>
<td></td>
<td>4. Algebra and Linear Relationships</td>
<td>Application Task</td>
</tr>
<tr>
<td></td>
<td><strong>--End of Semester 2--</strong></td>
<td>Examination of all Semester 2 topics 1 – 4</td>
</tr>
</tbody>
</table>
**Preparing for Maths Tests**

Preparation for tests can be achieved with a good plan and a steady study routine. The schedule that students set for themselves leading up to tests and examinations is also important. It is never a good idea to begin revision or study the night before a test or examination. The following is a suggested timeline as well as activities to support preparation for tests and examinations.

<table>
<thead>
<tr>
<th><strong>Preparing for Maths Tests</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suggested start:</strong> at least one (1) week before the scheduled test.</td>
</tr>
<tr>
<td>Read through your notes and make sure they are a complete set. If you find there are notes missing see your teacher to catch up immediately.</td>
</tr>
<tr>
<td><strong>Day 1:</strong></td>
</tr>
<tr>
<td>Read through the entirety of your notes and try and make connections with the different concepts. Aim to understand the concepts involved.</td>
</tr>
<tr>
<td><strong>Day 2:</strong></td>
</tr>
<tr>
<td>Write out a summary sheet to take in to your test/exam. Make sure you read through your notes to work out what to include. Also include:</td>
</tr>
<tr>
<td>• Definitions</td>
</tr>
<tr>
<td>• Formulae</td>
</tr>
<tr>
<td>• Key ideas</td>
</tr>
<tr>
<td>• Examples</td>
</tr>
<tr>
<td>• Diagrams and Graphs (where necessary)</td>
</tr>
<tr>
<td><strong>Day 3:</strong></td>
</tr>
<tr>
<td>Practice some basic questions with your summary notes by your side. Add things to your summary notes if need be.</td>
</tr>
<tr>
<td><strong>Day 4:</strong></td>
</tr>
<tr>
<td>At this stage you should be reviewing your summary notes and ensuring that it helps you. If you are finding it hard to locate things use colour to help.</td>
</tr>
<tr>
<td><strong>Day 5:</strong></td>
</tr>
<tr>
<td>Complete practice questions with your summary notes. Time yourself. Make a list of questions that you struggle with and seek assistance from your teacher.</td>
</tr>
<tr>
<td><strong>Days 6 and 7:</strong></td>
</tr>
<tr>
<td>Complete more practice questions. Seek further assistance if necessary.</td>
</tr>
</tbody>
</table>

**Remember to reflect on your test performance after test...**

After each topic test, reflect on the test, how you studied - what worked and what didn’t.

Include information you could have done with on test day that was not in your folio. Make detailed folio notes and make sure you understand any material you didn’t know well enough for the test.

This type of reflection will contribute to your exam preparation.

This behaviour is part of a growth mindset!
## Preparing for exams

1. Exam preparation needs to begin during the semester - **NOT** right before the examination day. Preparation for the mid-year examination needs to begin in term 1. Preparation for the end of year examination needs to begin in term 3.
2. Prepare summary notes and reference sheets and refer to them regularly.
3. Study and review the mathematical concepts learned in class every week – whether revision homework has been set or not.
4. Complete randomly selected questions (from exercises, chapter review or HOTMaths) using the reference sheets which will give a good indication of whether the reference sheets will be useful in the examination.

### Preparing for Maths Exams

<table>
<thead>
<tr>
<th>Suggested start: the term before (term 2 examination – start in term 1 and term 4 examination start in term 3)</th>
<th>Read through your notes. Identify the area(s) and make a list of topics and content you can aim to improve on during the study period.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Summary Sheets</strong> (also called reference sheets or “cheat sheets”)</td>
<td><strong>Review your summary sheets</strong> that were used for the different topics. Review each topic test and see if your summary sheet was sufficient enough to help you. If not, <strong>create a new summary sheet</strong> making sure that it covers questions and concepts that you had the most difficulty.</td>
</tr>
<tr>
<td><strong>Step 2: Concepts</strong></td>
<td>You have already learned everything that will be assessed on the exam. Start to go over all your tests as a whole and <strong>write down concepts that you struggled with across all topics</strong> – this could be simply showing steps to questions.</td>
</tr>
<tr>
<td><strong>Step 3: Practice, Practice, Practice!</strong></td>
<td>Complete as many <strong>practice questions</strong> as possible. Use HOTMaths to practice with during your study time. Correct your work and take note of problem areas. <strong>Seek assistance</strong> whenever you are unsure of key ideas and concepts.</td>
</tr>
</tbody>
</table>
Suggestions for Parents/Guardians

We encourage all students to ask for help as soon as they recognise they are falling behind, not understanding the concepts being studied or even if they wish to extend themselves further.

Parents are encouraged to contact their child’s mathematics teacher any time during the course of the year particularly if their child is struggling with their mathematics. If they are upset or anxious or never seem to have any maths homework, it is a good idea to contact their teacher before the pressure of exams arises.

The partnership between teacher and parent/guardian is vital to ensure all students achieve success in mathematics now and into the future.

Contact Us

The first person to contact is a student finds him or herself struggling or falling behind with their work is their mathematics teacher. The year 9 mathematics team are listed below:

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Class</th>
<th>Office Location</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr M Johnson</td>
<td>MAT09C</td>
<td>Gonzales Centre</td>
<td><a href="mailto:matthew.johnson@assumption.vic.edu.au">matthew.johnson@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mr J Weber</td>
<td>MAT09B, MAT09G</td>
<td>107</td>
<td><a href="mailto:john.weber@assumption.vic.edu.au">john.weber@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mr C Devine</td>
<td>MAT09E</td>
<td>334</td>
<td><a href="mailto:conor.devine@assumption.vic.edu.au">conor.devine@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mr P Jongeblod</td>
<td>MAT09F</td>
<td></td>
<td><a href="mailto:peter.jongeblod@assumption.vic.edu.au">peter.jongeblod@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mrs S Kift</td>
<td>MAT09D</td>
<td>334</td>
<td><a href="mailto:sue.kift@assumption.vic.edu.au">sue.kift@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mr K Edwards</td>
<td>MAT09A(Accelerated)</td>
<td>216</td>
<td><a href="mailto:kim.edwards@assumption.vic.edu.au">kim.edwards@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Ms K Honey</td>
<td>LEC</td>
<td>LEC</td>
<td><a href="mailto:kellie.honey@assumption.vic.edu.au">kellie.honey@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mr N Coots</td>
<td>MAI09E</td>
<td>526</td>
<td><a href="mailto:nicholas.coots@assumption.vic.edu.au">nicholas.coots@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Mrs N Collins</td>
<td>MAI09C</td>
<td>334</td>
<td><a href="mailto:narelle.collins@assumption.vic.edu.au">narelle.collins@assumption.vic.edu.au</a></td>
</tr>
<tr>
<td>Ms L Sarraf</td>
<td>LAC – Snr Maths</td>
<td>526</td>
<td><a href="mailto:laila.sarraf@assumption.vic.edu.au">laila.sarraf@assumption.vic.edu.au</a></td>
</tr>
</tbody>
</table>

If there are any questions or concerns at any stage of the year please feel free to contact the school any time.

We hope the partnership between school and home continues to grow ensuring each student obtains a strong mathematical future.