

FOUR WAYS TO STUDY MATHEMATICS

PRACTICAL OPTIONS FOR YOUR STUDY OF MATHEMATICS

1 MEMORISING FACTS!

To summarise a particular topic:

- Open your textbook and scan each page, writing down anything that you don't already know. If there is any doubt in your mind, write it down!
- Spend some time putting the material into some order and structure that makes sense to you.
- Put your new summary aside and try to recreate it from memory while it's fresh in your mind, then compare the two and fill in any bits that you missed.
- Repeat this process until you can reproduce your notes from memory, and then use your diary to make sure that you rehearse the material at properly spaced intervals until you're satisfied that the summary is in your long term memory.
- Make summaries of your summaries by eliminating everything that you're confident you've already learned properly, and revise these — but occasionally return to your original summary.

Try other ways of learning notes: speaking out aloud, listening to recorded notes, combining rehearsal with physical activity such as walking or jogging, putting your notes to music, and by using a variety of mnemonic devices (memory aids including the use of acronyms and memory pegs or memory keys).

Search for memory aids on the Internet, experiment, and learn what works for you!

2 INTERNALISING SKILLS!

- Complete your homework.
- Keep doing questions until you fully understand the material and the process.
- Ask for help if you don't understand the work.
- Never leave a question that you cannot do.
- Ensure that you are capable of solving every question in the topic.
- Find extra questions to practice on (ask your teacher, look in libraries or on the Internet).
- Remember to practice very clear setting out and to develop good habits when answering mathematical questions! Get the details right and practice them!
- When you understand the work, use a timer to race the clock as you build speed.
- When you are fast and accurate on paper, practice mental drill exercises to build speed and accuracy and further understanding. Have someone else check your answers.
- Use your diary to make sure that this skill stays in your long term memory by always practicing the work again before you forget it.

Remember to work through the three phases of learning: understanding, speed, and long term memory.



3 AVOIDING ERRORS!

- Search your returned exam papers for questions that you got wrong because of carelessness.
- Try to work out why it was that you made the mistake.
- Try to think of habits that you could develop or improve that would help you avoid those errors. You might try drawing larger diagrams or placing them in a different part of the page, completing one action before starting another, writing each step and not doing too much working in your head, setting your work out in clear steps using headings, writing the formula before substituting values into it, re-reading each question after you've finished answering it, making sure that your equal signs line up, solving entire problems in one big equation, always copying the entire answer from the calculator screen before you reread the question find how you should truncate your answer and what kind of units are required, etc.

Always think in terms of developing very good habits and be prepared to spend some time thinking through how you answer different kinds of questions. Try to establish a very sound procedure for answering certain kinds of questions and practice the procedure until it is 'second nature' to you.

First we make our habits,
then our habits make us.

~ Charles C Noble

4 BUILDING SUPERIOR SKILL!

- Go exploring. Look for opportunities to think mathematically and to be challenged with difficult questions. Search for challenge questions or challenge exercises in some text books, ask your teacher for more challenging material, subscribe to a students' mathematics journal, seek out challenging competitions (ask your teacher whether there are mathematics competitions that you can enter), find books of puzzles and challenging material in your local library or your school library, and search for challenging mathematical material on the internet (ask a teacher for advice or help).
- Be prepared to spend hours on a single question. Remember that, even if you don't succeed in solving a problem, this is some of the best study that you will ever do!

The fourth way in which you can study mathematics is to occasionally tackle quite difficult problems and to go exploring. The rewards are truly immense and satisfying!

Use your knowledge of the four different ways of studying mathematics to create variety and interest for yourself when you're studying.

Remember that the first three methods will form the foundation for all your study of mathematics, but it is the fourth method that will help you develop into a superior mathematician!