

STUDY SKILLS - MATHEMATICS

Many students have trouble learning mathematics because they never develop the particular study habits which are conducive to success in mathematics. If you practise the following suggestions they should prove invaluable to you.

- **Summarise each topic and learn/memorise the key facts** (formula, definitions, key works).
 - make note cards
 - draw mind maps
 - paraphrase your notes
- **Learn the meaning of these instruction words**

calculate	- determine, work out
complete	- finish, continue
define	- give the exact meaning
describe/discuss	- give an account of the main features
estimate	- give an approximate answer for
expand	- multiply out the brackets
explain	- clarify, demonstrate, interpret
express	- present, show, indicate
evaluate	- solve
factorise	- write the answer with brackets (reverse of expand)
find	- calculate or work out
identify	- recognise, name
investigate	- work out and give your conclusion
prove	- show by mathematical reasoning
show that	- provide working or give mathematical reason to justify the answer
simplify	- express in the simplest, most basic form
solution	- an explanation or answer
solve	- find the answer to
state	- name, write down
- **Practise examples** from your workbook, textbook or assignment
- **Show your working.** In exams, credit is given for correct methods in answers, even if errors are made during calculation. Working may be as simple as writing the numbers and operations you put into your calculator.
- **Just do it!** Don't waste time worrying that you do not understand why something happens. If you can follow the steps in an example, follow the same steps with your question. Understanding often follows.
- **Practise past exam papers.** This gets you used to the layout, wording and types of questions. You should aim to work through at least six past exam papers, some under the same conditions as the final examination (three hours, no books, etc).
- **Read carefully and deliberately.** The way in which you should read in mathematics is quite different from the way you read a history book, newspaper, or a novel. In mathematics you must read slowly, absorbing each word. It is sometimes necessary to

read a discussion, or problem, many times before it begins to “make sense” to you. In reading mathematics each word or symbol is important because there are many thoughts condensed into a few statements.

- **Think with pencil and paper.** Test out ideas you are reading about on paper. When an example is fully worked out in the text, work it out for yourself on paper. This will help to clinch ideas and procedures in your mind. After you have read and re-read a problem carefully, if you still don't see what to do, don't just sit and look at it. Get your pencil and try to “dig it out”. If, in attempting to solve a problem you have nothing written on the paper, you have not yet exerted enough effort to justify seeking help.
- **Be independent.** If you seek help needlessly, either from your teacher or classmate, you will not gain the maximum benefit from your work. It takes exercise to become strong and you cannot do it through someone else's exercise. However you must **ask questions when necessary**. Do not be afraid to ask questions that sound “dumb”. The only “dumb” action is to fail to ask about a topic/idea you have tried to grasp, and still do not understand.
- **Persevere.** Do not become frustrated if a topic or problem completely baffles you at first. Stick with it! An extremely interesting characteristic of learning mathematics is that at one moment you may feel totally at loss, and then suddenly have a burst of insight that enables you to understand the problem perfectly. If you don't seem to be making progress and have been working on a problem for some time, put it aside and attack it again later. Many times you will then see the solution immediately as your sub-conscious has been working on it. There is tremendous satisfaction from persevering and independently solving a problem you found difficult.
- **Take time to reflect.** To learn mathematics well you must take time to do some reflective thinking about the material covered. It takes time for some ideas in mathematics to “sink in”. You may have to live with them a while and do reflective thinking about them before they become a part of you.

Learning mathematics is not an activity for the intellectually lazy. It requires a strong, steady effort. There is no other successful way. Neither is mathematics a spectator sport; you must become actively involved. So do not expect to sit idly by and watch your teacher do the work. This may keep your teacher in good condition, but it won't do you much good.