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## IT'S NOT AS SCARY AS YOU THINK!

Welcome to *Maths Skills for Success at University*. We have written this book for students just like you – who need to do some maths as part of their course but are concerned about doing so. For some students this is because they may not have done much maths since leaving school (which could have been quite a while ago). For other students maths might have always been a bit of a struggle and so they may be lacking in confidence or even feeling quite anxious.

We would like to start this book by emphasising that maths is not as scary as you think and that by using this book you will be prepared to conquer the maths requirements in your course. In this introductory chapter, we will look at a few strategies you can use on your road to success. We will give you a chance to record how you feel about maths because doing so is a great way to identify what your hurdles might be. We have found that when we encourage students to reflectively record their attitudes towards maths they develop a more positive outlook.

So why might university students think that maths is scary? Well, there are many reasons that may include:

- Only those that are good at 'it' can do maths.
- I haven't done 'it' in years.
- I was never good at 'it' at school.
- I just haven't got a maths brain.
- I can't use a calculator.
- There's always too much information that is taught too fast.
- All of those numbers and symbols are plain confusing.

### REFLECTIVE ACTIVITY 1

So ... is maths a bit scary for you and what makes it so? Record your thoughts in your notebook.

# LEARNING MATHS IS LIKE LEARNING A NEW LANGUAGE

There are some things that are peculiar to learning and using maths that can make it a challenge. To begin with, learning maths is like learning a new language. Maths is full of words that can be foreign, including terms such as:

- quotient
- exponent
- factor
- reciprocal
- hypotenuse
- histogram.

A glossary is included in this book for you to use for maths words that may be unfamiliar.

And maths is not just about new or unfamiliar words and terms; it also involves the use of many symbols and other forms of notation that replace words. Knowing that learning maths is like learning a new language means that some of the strategies that work well when learning a language will also work well when learning maths such as:

- creating your own glossary with new terms and their definitions
- continually reviewing the meaning of new terms
- making a conscious effort to use the language of maths correctly.

## REFLECTIVE ACTIVITY 2

Use the index at the back of this book to locate the terms that have been listed above, and then try to write in your own words a basic definition for each term. Alternatively, locate the meaning of these terms in an easy to use web-based resource (such as [www.mathsisfun.com](http://www.mathsisfun.com)). Hopefully, you can see that this process is both easy and useful.

# MATHS IS SOMETHING THAT YOU DO, NOT JUST READ OR VIEW

Another aspect that is specific to learning and using maths is that it simply must be done, and not just read or viewed. We have heard students say many times that they understood everything perfectly well in our lectures when watching us complete examples on the board, and then when they sat down to do exercises themselves they went blank. What these students do not realise is that they do not really get 'it' when watching the lecture, even if they think they do. You can only get 'it' by doing 'it' with repeated practice. Think of learning and using maths

in the same way as learning and using a sport skill, such as playing golf. If only learning to play golf was as easy as watching the great champions on television. Anyone who has only partially mastered the game of golf will tell you that it only results from constant, repeated practice.

The message here is not to get lulled into a false sense of security, thinking that you understand something new without having done it repeatedly by yourself. You can also optimise your learning by applying these study strategies:

- Do not complete all of your out-of-class maths study in one great big block of time – 3 or 4 hours – on just one day.
- Do a little bit of maths each day – 20 to 30 minutes is all that is required.

This will keep the maths concepts and processes fresh in your mind.

## STUDYING MATHS AT UNIVERSITY

Studying anything at university is quite different to being at school, and maths is no exception. For students who are already thinking that maths is a bit scary, these differences can provide further challenges. Some of the differences are:

- At school attendance is mandatory; at university attendance is optional and your lecturer is not going to follow-up if you do not turn up!
- At school teachers constantly monitor student progress and achievements; at university students receive their grades at the end of the semester and need to monitor their own progress.
- At school students see their teacher every day; at university students normally see their lecturer once or twice a week.
- At school teachers prepare students for tests that occur frequently; at university assessment activities occur less frequently and students are required to manage their own preparation.

Given these differences, the key to success at university is to manage your time well and to take responsibility for your progress through good study habits such as:

- doing some maths every day
- attending all your classes, unless it is unavoidable
- ensuring you catch up using resources that your lecturer puts online, if you miss a lecture
- keeping an organised notebook for maths
- finding or organising a study group with other students to support each other.

## MATHS ANXIETY

Maths anxiety, which is a feeling of tension, apprehension or fear that interferes with learning or using maths, has been well documented as a key reason for people to have an aversion to studying maths and using even simple maths in their daily lives. Research has

found that the brain areas that are active when maths-anxious people prepare to do maths overlap with the same brain areas that register the threat of bodily harm. So the main problem is that fear stops people from using maths, and not a lack of maths skills.

There are a number of factors that cause maths anxiety. The first is that some people have less than positive maths learning experiences at school especially at a young age. These experiences can trigger a fear of not being good at maths, or even not being able to do maths at all. A second factor is that, unfortunately, there exists a general societal view that maths is hard and that only smart people can do maths. This can create unreasonable expectations and pressure, especially during the school years. Once the seeds of maths anxiety have been sown, many negative consequences can arise. For example, maths-anxious people might:

- lose confidence in themselves and in their academic abilities
- trust blindly any bills they receive, because they do not want to engage with figures and numbers
- not be able to help their children with their homework
- avoid enrolling in courses in case they contain maths
- leave courses when they encounter the ‘maths part’.

So, what can be done about maths anxiety? As we have already noted, reflectively articulating your attitudes towards maths is one strategy that can develop a more positive outlook. Specifically, we have found that encouraging our students to create a personal maths metaphor is a useful reflective activity that can highlight deep-seated emotions that might exist regarding maths.

## PERSONAL MATHS METAPHOR

When creating a personal maths metaphor, you compare maths to specific things or objects as a way of focusing how you feel about learning or using maths. We have found that in creating a personal maths metaphor our students have been helped to recognise the value of mathematics, which has enhanced their chance of success in their studies. So why not try it yourself?

### REFLECTIVE ACTIVITY 3

Let’s start creating your personal maths metaphor by firstly imagining that you are describing what maths is to someone. In your notebook, write a list of the words or phrases you might use.

### REFLECTIVE ACTIVITY 4

Now imagine that you are using maths either at university or in your everyday life. In your notebook, write a list of words or phrases to describe what doing or using maths feels like to you.

**REFLECTIVE ACTIVITY 5**

Next think about things or objects that reflect what maths is like for you. For example:

- If mathematics was weather, what kind of weather would it be?
- If mathematics was a food, what food would it be?
- If mathematics was a colour, what colour would it be?
- If mathematics was an animal, what animal would it be?
- If mathematics was a type of music, what type of music would it be?

In your notebook, write a list of things or objects that you think mathematics is like.

**REFLECTIVE ACTIVITY 6**

Read over the list of words and phrases that best describes mathematics for you and the list that describes how you feel about learning or using mathematics. Now from the list of things or objects that you think mathematics is like, select the item on your list that *best* describes what mathematics is like for you. In your notebook, note all the ways that mathematics and this thing or object are alike.

**REFLECTIVE ACTIVITY 7**

Now you are ready to create your personal maths metaphor. Start your metaphor with the phrase: 'For me, maths is like ...' Complete your metaphor by adding a short paragraph to describe the ways the thing or object you have selected and maths are similar. Think in particular about how this metaphor describes how you feel about using or doing mathematics. Here are some metaphors our students have written as an example:

- For me maths is like a roller coaster because you put a lot of courage into getting on it and doing it. And after a crazy ride, you get off the roller coaster that is maths, and you feel pride for having done it.
- For me maths is like a snowstorm. Firstly, it looks cold and terrible but once you have the right warm clothes you can see the beauty of the snow.
- For me maths is like an electrical circuit. When all the components are in place, the light bulb comes on. When a component breaks down, the circuit is cut and you're left in the dark.

In your notebook, create your personal maths metaphor.

So, we hope that we have convinced you that maths is not as scary as you think. If you apply any or all the strategies that we have suggested in this chapter, we hope that you will continue to develop your Maths Skills for Success at University.