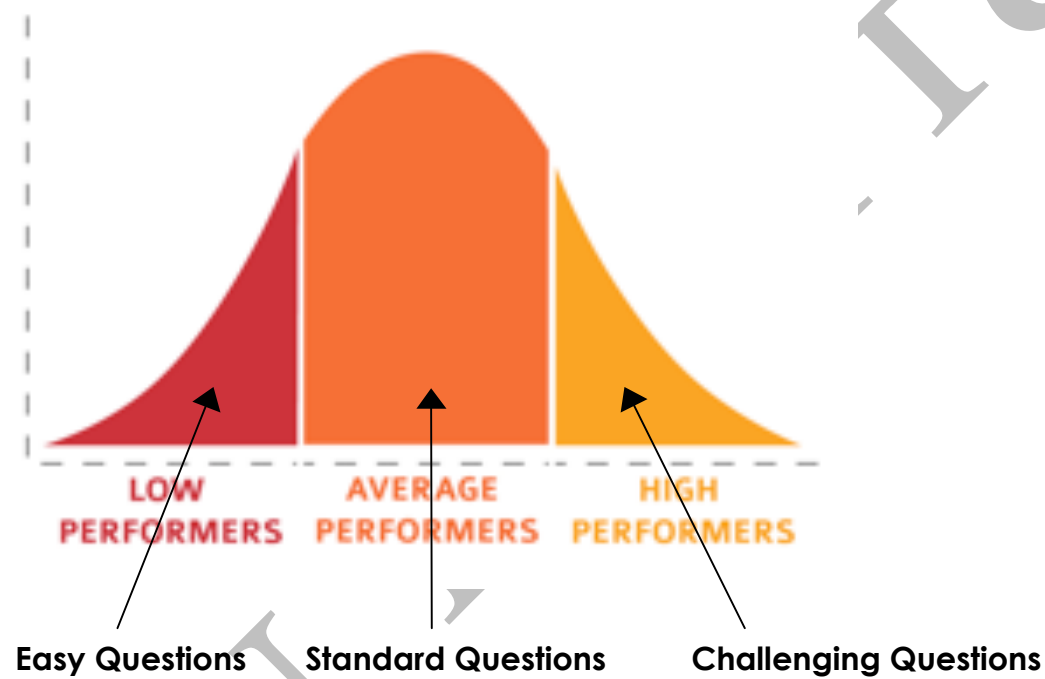


How to create a “cheat sheet” for exams?

- By Phoebe Yee, Director of Brain Matter

When I was studying mathematics as my Major in NUS, one of my fondest memories of my math exam is the CHEAT SHEET. For most of the math exams in NUS, students are allowed to bring in a piece of A4 paper into the examination hall. This piece of paper (which we called CHEAT SHEET) is the lifeline for most of us students as it contains all the mathematical formulae or even examples and answers from lecture notes. In short, you can write on that A4 paper just anything you think will help you for the exams. I remember how I hated writing cheat sheets because it would take me hours to write and squeeze my tiny words and numbers into a blank piece of white paper, which was later, transformed into a very colorful piece of ‘artwork’. But I must say it has helped me a great deal because it forced me to revise as I write down my notes. And, especially when I spotted the right questions from my lecture notes and copied the answers down on my cheat sheet. Oh, that thought of Lady Luck smiling upon me!

As compared to University Level, Secondary Level math is definitely more manageable and predictable. Remember the Bell Curve that I showed you in the last article? Most questions will fall into 3 categories: The Easy, The Standard (Majority of the questions) and The Challenging. Questions from The Easy and Standard category will not differ much and the smart thing we can do is to make sure we master the art of answering those questions. When I say that the questions don’t differ much, I mean questions of those type will not change in their question approach. Sometimes, we call them the typical questions with just a change in the values of the variables. By understanding this, we will be able to prepare ourselves to excel.



“If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle.”

— Sun Tzu, *The Art of War*

It's not about bashing through the 'war' called math exams by doing many questions and making the same mistakes. But it is about knowing yourself and the nature of the paper/topics. That will give you the greatest victory.

In the next part, I'll be teaching you how to make your own cheat sheet and identify different question types. I must warn you that it will take time and it's not an easy process. However, by doing so, it will give you an upper hand in the topics because you have in your hands the different question types.

Are you ready?

I'm using a very short topic as the focus of this example. It's a Secondary 3 Additional Math topic- **Binomial Theorem**.

Section		*Remarks
Introduction	<p>1. Binomial is about EXPANSION of expression.</p> <p>2. $(a+b)^n = a^n + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \binom{n}{3}a^{n-3}b^3 + \dots$</p> <p>3. General Term: $T_{r+1} = \binom{n}{r}a^{n-r}b^r$</p> <p>4. Binomial Coefficient: $\binom{n}{r} = \frac{n!}{r!(n-r)!}$</p>	First of all, start with knowing the definitions and formulae
Easy Questions	1. Using Binomial Theorem, find the first four terms of $(1+3x)^4$.	Easy Questions usually deal with applying formulae in a very straightforward
Standard Questions	1. Using Binomial Theorem, find the first three terms of $\left(1-\frac{x}{5}\right)^7$.	Standard Questions are questions often found in our textbook exercises or assessment books. Usually, the values of the variables are changed but the question types will not divert too much away from these standard form.
	i) Hence, obtain the coefficient of x^2 in the expansion of $(3x+2)\left(1-\frac{x}{5}\right)^7$.	
	ii) Hence, estimate the value of $2.3 \times (0.98)^7$, correct to 3 significant figures.	
	2. Using Binomial Theorem, find the first three terms of $\left(5x+\frac{2}{x^2}\right)^7$.	
	Hence, obtain the coefficient of x^2 in the expansion of $(4x-2)^2\left(5x+\frac{2}{x^2}\right)^7$.	
	3. Find the term independent of x in $\left(x+\frac{\sqrt{3}}{x^3}\right)^7$.	
4. Find the coefficient of x^{-1} in the binomial expansion of $\left(3x^2-\frac{2}{x^3}\right)^7$.		
5. Given that the coefficient of the third term in the expansion of $(2x-3)^n$ is -253440 , find the value of n where n is a positive integer.		
6. In the expansion of $(3+2x)^n$, the coefficient of x^2 and x^3 are in the ratio of 9:1. Find the value of n .		
Challenging Questions	1. Given that $(1+kx)^n = 1+20x+45k^2x^2+\dots$, find the value of k and n .	Challenging questions are hardly predictable. They are either more complicated in form or require knowledge from other chapters. To answer these questions, students have to be generally strong in their foundation in math and have a thorough understanding of the chapter.
	2. Obtain the first three terms in the expansion, in ascending powers of x , of $\left(4-\frac{x^2}{3}\right)^6$. Hence, find the coefficient of x^3 in the expansion of $\left(1+\frac{2x}{\sqrt{3}}\right)^6\left(1-\frac{2x}{\sqrt{3}}\right)^6$.	