MATRIC REVISION

MATRIC REVISION 2008

education
Department: Education
REPUBLIC OF SOUTH AFRICA

TOP TIPS FROM THE EXPERTS: EDITION 1 OF 13 — MATHEMATICS: PAPER 1

Get to it – do it: Ace your Maths exam!

Good luck message

Celebrity hola!

DJ Cleo

"Trust me, it's not that bad"

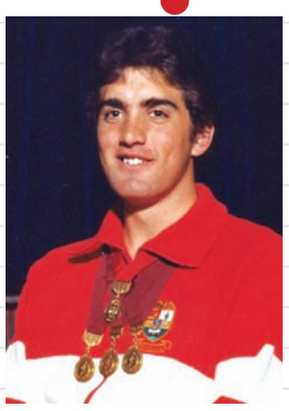
"Heita, Class of 2008! I hope you're studying hard. To some it might seem like an impossible dream, but where I am now seems more like an impossible dream. If I can get this far then matric is nothing – you can do it!"

EISH! The Grade 12s at Kwamahlobo High School are already feeling the pressure

MEET OUR MATHEMATICS EXPERT

A BEAUTIFUL MIND: Jacques today

Jacques du Plessis



SCHOOL DAZE: Jacques in Grade 12

Jacques matriculated at Benoni Technical High School, where he was a prefect and a provincial sportsman. He decided to study to become a Mathematics teacher and has been teaching Mathematics with great results over the past 20 years at four different schools.

His matric students have excelled under his tuition in both Mathematics and Additional Mathematics, for which he was an examiner for a period of time. Jacques is currently one of the Maths 911 broadcasters on DSTV channel 319.

He has written and edited various Mathematics publications based on the new curriculum and is the co-author of the new Xkit for Grade 12s. He has a huge passion for Mathematics – it is his belief that Mathematics draws the soul towards truth – and it is his mission to share that passion and belief with learners and teachers alike.

> *Jacques believes Mathematics draws the soul closer to truth*

Jacques currently works at the School of Education at the University of the Witwatersrand in the division of Mathematics and Science Education. He has a Masters degree in Mathematics Education and is looking forward to completing his PhD in the next four years.

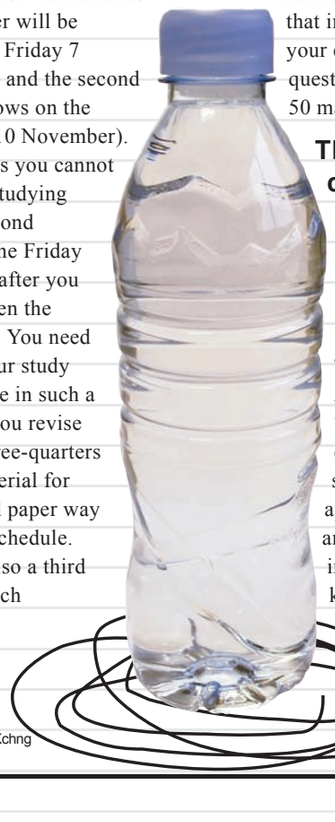
So, you've spent the last 12 years at school and everything you've learnt over all these years is about to be assessed in your final examinations, which run from 29 October to 3 December. The Class of 2008 is extra-special in that you will be the first group of matriculants ever to write the new National Senior Certificate (NSC). While this is exciting, it's also a bit nerve-wracking – particularly as there are no "past papers" to work through as you prepare. What we do have are all the exemplar papers supplied by the Department of Education as guidelines of what to expect (you will find these at www.education.gov.za). You can also find the Grade 12 exemplars in Study Mate – phone (012) 312-5303 for more information.

The first Mathematics exam paper will be written on Friday 7 November and the second paper follows on the Monday (10 November). This means you cannot just start studying for the second paper on the Friday afternoon after you have written the first paper. You need to plan your study programme in such a way that you revise at least three-quarters of the material for the second paper way ahead of schedule. There is also a third paper, which will be written on Wednesday 3 December, but it is optional.

Picture: StockXchng

Managing your time in the examination

Paper 1 and Paper 2 are both 3-hour papers worth 150 marks. Paper 3 is a 2-hour paper for 100 marks. Use this information to schedule how much time to spend per question. Let's see how this works: 150 marks divided by 180 minutes = 0.83 marks per minute, so if a question is for 7 marks, you should not spend more than 8-and-a-half minutes answering it. It is important that you manage the 3 hours effectively. Try to make sure that in each hour of your exam, you answer questions worth at least 50 marks.



Picture: StockXchng

The composition of the paper

Each of the Mathematics papers will have their fair share of "easy" questions. Approximately 70 to 75 marks could be testing straight-forward applications that are procedural in nature. If you know your work, have studied properly and can execute the basic procedures, you stand a good chance of scoring 50% just by answering all these questions correctly! Do not rely on the formulas you may be given in the exam – you will waste time if you have to keep going back and forth to the formula sheet, which should only be used as back-up. If you know your formulas well you will be able to identify where they apply in the paper.

The second half of the paper will focus mainly on applying the skills you have learnt: those types of questions where you have to decide which of the formulas and methods you have learnt over the years apply best to a particular situation. On the right are some examples of the different types of questions you can expect in your Mathematics examinations:

PLEASE NOTE: The analysis on the right is based on the exemplar for Paper 1 and the marks that were allocated for the different sections. It is the kind of weighting we can probably expect in the final Paper 1, but it is not guaranteed that this is what you will get in the actual exam! You therefore need to prepare yourself properly. Bear in mind that for every hour you spend in an examination, you should study for at least 8 hours. If you're aiming for a distinction, bargain on 12 hours of studying for every one hour in the examination session.

Paper 1 will consist of the following sections:

Q1: THE SOLVING OF BASIC EQUATIONS AND INEQUALITIES (19 marks/23 minutes)

This section could include:

- Cubic equations – for example: $x^3 - 4x^2 - 11x + 30 = 0$
- Basic log / exponential equations: $5^{x+1} = 3$
- Quadratic equations: $x^2 - x = 6$ or $x(x + 4) = 7$
- Simultaneous equations

Q2: FINANCIAL MATHEMATICS (19 marks/23 minutes)

Know this section well – and which formulas apply to what situation. When is something an annuity and when is it a compound interest problem? For Present Value, you need to be able to work out the outstanding balance on a loan, the size of the periodic payments and the period of the loan. Use the present value formula for all loans. You also get a present value problem that is an investment problem – when you invest a lump sum now to make equal periodic withdrawals from the account – but investments are usually Future Value problems. Understand sinking funds well. Also make sure you can work out the regular payment in a hire purchase agreement (based on simple interest). It is likely you will also be asked about growth and decay, the doubling and halving of bacteria, etc.

Q3, 4, 5: NUMBER PATTERNS AND SEQUENCES (27 marks/32 minutes)

When you search for patterns in nature or in the context of numbers, look for what is regular and what is different. Patterns appear as number sequences, tessellations on diagrams, geometric shapes and periodic repetitions of situations. You could be asked to look at shapes and establish pattern, or to investigate an arithmetic, quadratic or exponential relationship between numbers. You need to be able to determine the sum of both arithmetic and geometric series, as well as find general rules that express the general term in a sequence of numbers both algebraically and in words - so familiarise yourself with all the relevant methods and formulas. Do not learn senseless recipes and big formulas off by heart, rather train your brain to do the mental gym required. Make sure you understand pattern conceptually as it also links well to functions and to transformation geometry.

Q6, 7, 8 & 10: FUNCTIONS AND THEIR TRANSFORMATIONS (51 marks, including 26 for the cubic curve/62 minutes)

This section is very important. Make sure you can draw the functions AND transform them - i.e. translate, rotate and reflect them all over the Cartesian plane. Again, do not learn things off by heart – you need to understand how the different parameter shifts translate into transformations of some parent function. Understand the inverse function concept and what transformation brings us to the inverse. Know how to determine the equation of a graph if you are given a certain point on the graph. Typical questions could investigate the domain and the range of a function. You will definitely be asked about the concept of *function* and *inverse function* so make sure you know which tests to perform. Make sure you can sketch the cubic function. (This question is usually part of the calculus section on the graph and can be worth 12 to 26 marks). The function concept integrates well with other sections in Maths, especially transformation geometry and number pattern, so it could pop up anywhere in the paper.

Q9 & 11: DIFFERENTIAL CALCULUS (Excluding the 26 marks for the cubic, this section is for 20 marks. If we include the cubic curve, you can expect 46 marks of calculus and its applications/55 minutes)

Understand differentiation an expression. Expect a first principles question and also differentiation by using the power rule: know that $f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ and also that if $f(x) = ax^n$, then $f'(x) = a \cdot nx^{n-1}$. This could earn you 10 to 15 marks. The graph question that was included under function in the exemplar (26 marks) is usually in the calculus section, as it involves using the derivative to determine where the function has a stationary point, a point of inflection and where it is increasing and/or decreasing. Be able to apply the concept of the derivative to various application-type questions. You could be asked to find various dimensions of a shape based on the area being a minimum or the volume a maximum. You could be asked to maximise the profit a company makes or minimise the consumption of a vehicle. It is important to know how to find rules/formulas to express these answers with. Know the area and volume formulas, as well as how to calculate profit, etc.

Q12: LINEAR PROGRAMMING (14 marks/17 minutes)

Practise this section - it is an easy way to score marks. Know how to change sentences into mathematical statements (organise the information into a table format so it makes sense). Be able to find the constraints and express them mathematically, sketch them on the same set of axes, and indicate where the feasible region lies (this could earn you 8 to 12 marks). Be able to formulate and sketch the objective function and read off an optimum solution from your graph. Because you need to make accurate readings, your scale is very important. Remember that on the axes, the points that indicate your calibration (scale) must be equally spaced.

Picture: StockXchng

NEXT WEEK : ENGLISH HOME LANGUAGE