Northampton School *for* Boys

A Level Mathematics Transition

This booklet is designed to give you information on what you can expect from the course that you will start in September.

Essential Information

Mathematics Team Leader and KS5 Learning Coordinator: Mr Mirnateghi (MMI)

Email: mmirnatehgi@nsb.northants.sch.uk

Examination Board: EDEXCEL

Course Title and code: GCE Mathematics (9MA0)

Exam Board Specification Page:
https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/mathematics-2017.coursematerials.html#filterQuery=Pearson-UK:Category%2FSpecification-and-sample-assessments

Course Outline

Tested in the summer of 2023.

Separate pure and applied papers
• Simple 2:1 ratio of pure mathematics to applied

• Single large data set for the lifetime of the qualification
• No non-calculator assessment

Paper 1: Pure Mathematics
33%
Examination length: 2 hours
100 marks

Paper 2: Pure Mathematics
33%
Examination length: 2 hours
100 marks

Paper 3: Mechanics and Statistics
33%
Examination length: 2 hours
100 marks
50 marks on statistics and 50 marks on mechanics

Home Learning

Students are expected to spend between 6 – 8 hours on their mathematics work each week. This will cover completing the set homework, revision for assessments and personal research.

Calculators

It is essential for the new Linear A Level that every student owns (at minimum) a scientific calculator. The examination board has insisted that calculators used must include the following functions: the ability to commute summary statistics and access probabilities from standard statistical distributions and also have an iterative function.

Based on our research; our recommendation would be the Casio Fx-991EX Scientific Calculator.

Support

Your first place of contact if you have difficulties is your class teacher. There is also a number of Maths Clinics run in the week for all Sixth Form students to bring their problems and ask questions.

Assessment

There are regular tests and assessments throughout the year. If a student obtains less than their Minimum Achievement Grade (MAG), a letter will be sent home informing their parents and the student must resit that test.

Research

It would be extremely beneficial if you were to do some preliminary research over the summer holidays.

The following books are also recommended:

Does God Play Dice?   Ian Stewart
Why do Buses Come in Threes?   Rob Eastaway
A History of Mathematics   Carl Boyer
How to Lie with Statistics   Daryl Huff

Sixth Form Mathematics Phase 2 Home Learning

This homework is to be completed without a calculator. Please print and complete. Please show all working out and method and complete to your best ability in both quantity and quality.

Part A: Solve by factorising

1) $x^2 + 5x + 4 = 0$

5) $2x^2 - 2 = 0$

(2)

(2)

2) $x^2 - 6x - 55 = 0$

6) $x^3 - x = 0$

(2)

(2)

3) $x^2 - 9 = 0$

7) $6x^2 + 11x + 3 = 0$

(2)

(2)

4) $16x^2 - 1 = 0$

8) $3x^2 - 10x + 8 = 0$

(2)

(3)

(3)

Part B: Solve by completing the square

1) $x^2 + 4x - 3 = 0$

3) $x^2 - 3x - 2 = 0$

2) $x^2 - 8x - 18 = 0$

4) $x^2 - 7x - 1 = 0$

(3 each)

Part C: Solve *(remember to rearrange first and set = 0 to solve)*

1) $x^2 = 6 - x$

3) $(x - 3)^2 = 10$

(3 each)

2) $x + 5 = \dfrac{14}{x}$

4) $\dfrac{2}{x} + \dfrac{2}{x+1} = 3$

(4 each)

Part D: Simplify

1. $3x^2 y^3 \times 4x^3 y^4$

2. $(2x^3 y^2)^4$

3. $4x^5 y^2 \times 8xy^{-2}$

4. $6x^2 y^{-1} \div 2xy^{-2}$

5. $(7x^5 y^3)^0$

6. 4^{-2}

7. $16^{\frac{1}{2}}$

8. $27^{\frac{2}{3}}$

9. $1000^{-\frac{2}{3}}$

10. $(8y^3)^{\frac{1}{3}}$

(17)

Part E: Solve the simultaneous equations

1)
$$3x + 5y = 31$$
$$4x - 7y = -27$$

x =

y =

(3)

2)

$$x + y = 7$$
$$xy = 12$$

x =

y =

(4)

Part F:

(a)   Find the sum of the first 100 natural numbers, i.e. 1+2+3+….+100.

(3)

(b) Find the sum of the numbers between 1 and 100 which are divisible by 3

(3)

(c) Hence or otherwise find the sum of the numbers between 1 and 100 which are not divisible by 3.

(1)

Part G:

(a)   Find the equation of the line which passes through the coordinates

       A (3,5) and B (6,4)

(3)

(b)   The line cuts the x-axis at *C* and the y-axis at *D*, find the coordinates of *C* and *D(remember if a line cuts the x-axis then y = 0 and if it cuts the y-axis then*

       x = 0)

(2)

(c)   Calculate the area of the triangle OCD *(draw a sketch to help you)*

(2)

Part H: Write (where a and b are integer values)

1) $\sqrt{18} + \sqrt{50}$ in the form $a\sqrt{2}$

(2)

2) $\sqrt{80} - \sqrt{5}$ in the form $b\sqrt{5}$

(2)

Part I: Rationalise the denominator

1) $\dfrac{4}{\sqrt{8}}$

3) $\dfrac{3}{\sqrt{2}+1}$

(2)

(2)

2) $\dfrac{\sqrt{50}}{\sqrt{2}}$

4) $\dfrac{6}{3-\sqrt{2}}$

(2)

(2)

Part J: Simplify

1) $\dfrac{2x+4}{x^2+7x+10}$

(3)

2) $\dfrac{x^2-7x+12}{x^2-16}$

(3)