

Subject: Leaving Certificate Maths

Teacher: Mr Murphy

Lesson 24: Exam Preparation

24.1 Learning Intentions

After this week's lesson you will be able to;

- Outline the breakdown of the exam
- Avoid some simple errors that cost large marks
- Structure your answers to get the most amount of marks possible

24.2 Exam Tips

Your Exam:

- 300 Marks per paper.
- 2 papers, 2.5hrs in length (stay for the full time)
- Each paper has two sections.
- Section A, concepts and skills
- Section B, contexts and applications
- Be sure to have a calculator (scientific)
- How long should you spend on a question? Marks for the question divide it in half
- Show every single piece of "rough" work
- Sketch/Draw multiple representations of a question.
- Have a strategy for verifying/checking answers.
- Be very careful about rounding and units
- Ensure you have a full geometric set and you know how to use them
- Always review your answer in the context of the question (even in section A)
- Be open minded with a question. Questions are not only about one topic.
- Familiarise yourself with the tables book.
- Attempt every single question.
- Questions often give some hints regarding the type of answer you are looking for.
- Be neat.
- Have an estimate of your answer beforehand.
- Use a ruler for any graphs.

24.3 Previous Exam Questions

Question 1:

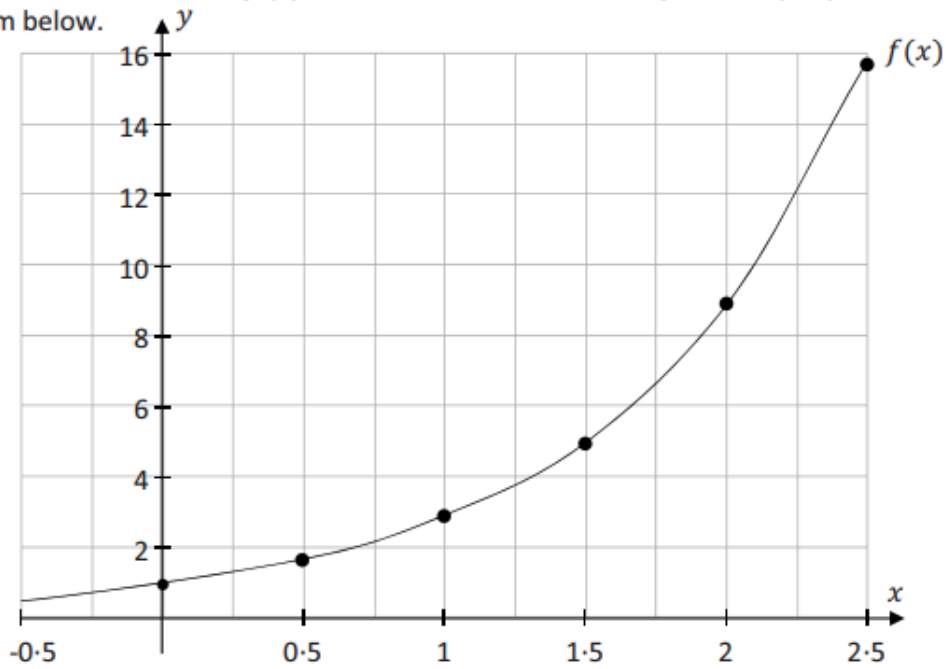
25 marks

- (a) In the expansion of $(2x + 1)(x^2 + px + 4)$, where $p \in \mathbb{N}$, the coefficient of x is twice the coefficient of x^2 . Find the value of p .

Question 2:

25 marks

The graph of the function $f(x) = 3^x$, where $x \in \mathbb{R}$, cuts the y -axis at $(0, 1)$ as shown in the diagram below.



(a) (i) Draw the graph of the function $g(x) = 4x + 1$ on the diagram.

(ii) Use substitution to verify that $f(x) < g(x)$, for $x = 1.9$.

Question 3:

25 marks

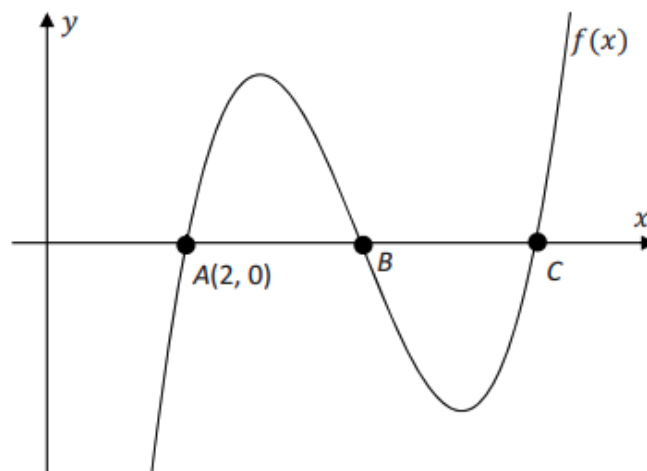
(a) Factorise fully: $3xy - 9x + 4y - 12$.

(b) $g(x) = 3x \ln x - 9x + 4 \ln x - 12$.
Using your answer to **part (a)** or otherwise, solve $g(x) = 0$.

Question 4:**25 marks**

(a) Find $\int(4x^3 - 6x + 10) dx$.

(b) Part of the graph of a cubic function $f(x)$ is shown below (graph not to scale). The graph cuts the x -axis at the three points $A(2, 0)$, B , and C .



(i) Given that $f'(x) = 6x^2 - 54x + 109$, show that $f(x) = 2x^3 - 27x^2 + 109x - 126$.

Question 4:**50 marks**

The weekly revenue produced by a company manufacturing air conditioning units is seasonal. The revenue (in euro) can be approximated by the function:

$$r(t) = 22\,500 \cos\left(\frac{\pi}{26}t\right) + 37\,500, \quad t \geq 0$$

where t is the number of weeks measured from the beginning of July and $\left(\frac{\pi}{26}t\right)$ is in radians.

- (a) Find the approximate revenue produced 20 weeks after the beginning of July. Give your answer correct to the nearest euro.
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- (b) Find the two values of the time t , within the first 52 weeks, when the revenue is approximately €26 250.

(c) Find $r'(t)$, the derivative of $r(t) = 22\,500 \cos\left(\frac{\pi}{26}t\right) + 37\,500$.

(d) Use calculus to show that the revenue is increasing 30 weeks after the beginning of July.

24.4 Recap of the Learning Intentions

After this week's lesson you will be able to;

- Outline the breakdown of the exam
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24.5 Solutions to 23.9

$$z = -\sqrt{3} + i, \text{ where } i^2 = -1.$$

(a) Use De Moivre's Theorem to write z^4 in the form $a + b\sqrt{c}i$, where a, b , and $c \in \mathbb{Z}$.

$$r = 2 \text{ and } \theta = \frac{5\pi}{6}$$

$$z = 2 \left(\cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6} \right)$$

$$z^4 = 16 \left(\cos \frac{10\pi}{3} + i \sin \frac{10\pi}{3} \right)$$

$$z^4 = -8 - 8\sqrt{3}i$$

(b) The complex number w is such that $|w| = 3$ and w makes an angle of 30° with the positive sense of the real axis. If $t = zw$, write t in its simplest form.

$$w = 3(\cos 30 + i \sin 30)$$

$$zw = 2 \left(\cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6} \right) \times 3(\cos 30 + i \sin 30)$$

$$zw = 6(\cos \pi + i \sin \pi)$$

$$zw = 6(-1 + 0i)$$

$$zw = -6$$



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