



Hello there! I hope your revision is going splendidly.

Welcome to my Predicted Paper 1 for Edexcel A Level Maths June 2025!

My name is Daniel, I am a full time GCSE and A Level Maths tutor with a First-Class degree In BSc Mathematics.

In addition to my tutoring sessions, I run a YouTube channel where I offer detailed walkthroughs of past GCSE and A-Level Maths papers. I am also on TikTok and Instagram, where I go through quick-fire questions to help students stay sharp, whether they're scrolling late at night or on their way to school!

This paper includes a variety of questions gathered from past exam papers (all publicly available) and questions created by me! I've uploaded a full video walkthrough for this paper on my YouTube channel – it's a great way to check your answers and understand the methods. You can access it by scanning the QR code below or in the top right corner of each page! Do the paper FIRST before watching the video!

# SCAN THE QR CODE FOR THE ENTIRE WALKHTROUGH







## **Colour Scheme and Question Breakdown**

In this predicted paper, the topics have been carefully analysed and categorised based on their frequency and appearance across all exam papers from the introduction of the new specification in 2018 up to the most recent paper in 2024. This analysis has been compiled into a detailed document, which you can find here: Edexcel A Level Maths Past Paper Topic Breakdown – Pure (2025). I have also gone through this analysis in detail in a video, which you can watch here: Watch the full breakdown on YouTube. The topics are colour-coded according to the following scheme:

# COLOUR SCHEME

- Core Topics that come up every year
- Almost every year
- In between "Almost every year" and "Appears occasionally"
- Appears occasionally
- Not as frequent
- Topics that haven't come up recently and I think will appear

#### **MORE INFO**

• There are 15 questions in this question paper. The total mark for this paper is 107.

• You have 2 hours 10 mins to complete the paper.

• The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

#### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.

• Check your answers if you have time at the end.

A Few Key Topics Not in the Paper:

- Parametric Equations
- Differential Equations
- Log Linear Modelling
- Radians, Sectors and Arcs
- Laws of Logarithms
- Exponential Modelling
- Arithmetic Sequences and Series
- Recurrence Relations
- The Modulus Functions

## QUESTION BREAKDOWN

- 1. Circles
- 2. Vectors
- 3. Trapezium Rule Estimating Further integrals
- 4. Integration as the limit of a sum
- 5. Small Angle Approximations
- Integration x^n The Factor Theorem Integration - Finding the curve given dy/dx
- 7. Binomial Expansion
- 8. Functions
- 9. Differentiation Product Rule The Chain Rule
- Increasing and Decreasing Functions 10. Sequences and Series
- (Involving Sigma Notation)
- 11. Harmonic Identities Rsin(Θ+α) Graph Transformations
- 12. Proof By Contradiction
- 13. Trigonometric Identities and Solving Equations Double Angle Formulae
- 14. Integration By Parts and Substitution
- 15. Differentiating a^x Differentiation – Stationary Points Numerical Methods – Locating Roots, Iteration

I couldn't include everything! These topics are just as likely to appear as the others, so make sure to revise them thoroughly.

The missing topics will be in my predicted Paper 2! So keep an eye out for that!

Wishing you the best of luck on this paper and the real exam! You got this.





1. Circles	
A circle $C$ has centre (3, 7)	
Given that the point $P(9, -2)$ lies on C	
<ul><li>(a) (i) find the radius of C</li><li>(ii) find an equation for C</li></ul>	(3)
(b) Find the equation of the tangent to C at P, giving your answer in the form $ax + by + c = 0$ where a, b and c are integers to be found.	(4)

































# Here:

# 6. Year 1 Integration and the Factor Theorem A curve C has equation y = f(x)Given that • $f'(x) = 8x^2 + bx - 15$ where b is a constant • the y intercept of C is -20 • (x - 3) is a factor of f(x)find, in simplest form, f(x) (6)





#### 7. Binomial Expansion

(a) Find the first 4 terms of the binomial expansion, in ascending powers of x, of

$$\left(\frac{1}{4} - \frac{1}{2}x\right)^{-\frac{3}{2}}$$
  $|x| < \frac{1}{2}$ 

giving each term in simplest form.

Given that

$$\left(\frac{1}{4} - \frac{1}{2}x\right)^n \left(\frac{1}{4} - \frac{1}{2}x\right)^{-\frac{3}{2}} = \left(\frac{1}{4} - \frac{1}{2}x\right)^{\frac{1}{2}}$$

(b) write down the value of *n*.

(c) Hence, or otherwise, find the first 3 terms of the binomial expansion, in ascending powers of x, of

$$\left(\frac{1}{4} - \frac{1}{2}x\right)^{\frac{1}{2}}$$
  $|x| < \frac{1}{2}$ 

giving each term in simplest form.

(5)

(1)

(3)











#### 9. Differentiation

Given that  $y = 4x(3x - 7)^5$ ,

(a) Show that

$$\frac{dy}{dx} = 4(3x-7)^4(Cx+D)$$

where C and D are integers to be found.

(4) (2)

(b) Hence, find the range of values of x for which y is decreasing.





Show that  $\sum_{n=3}^{\infty} \left(\frac{5}{6}\right)^n \cos(90n^\circ) = \frac{625}{2196}$ (5)







(d) State the smallest value of x at which a maximum point occurs for the curve with equation

$$y = -f(2x) \qquad x > 0 \tag{1}$$





## 12. Proof By Contradiction

Use proof by contradiction to prove that  $\sqrt{11}$  is irrational.

(You may assume that if k is an integer and  $k^2$  is a multiple of 11, then k is a multiple of 11)

(4)





13. Trigonometric Identities and Solving Equations  
In this question you must show all stages of your working.  
Solutions relying entirely on calculator technology are not acceptable.  
(a) Show that  

$$\frac{\cos 2x}{\sin x} + \frac{\sin 2x}{\cos x} \equiv \csc x \qquad x \neq \frac{n\pi}{2} \qquad n \in \mathbb{Z}$$
(b) Hence solve, for  $0 < \theta < \frac{\pi}{2}$ 

$$\left(\frac{\cos 2\theta}{\sin \theta} + \frac{\sin 2\theta}{\cos \theta}\right)^2 = 6 \cot \theta - 4$$
giving your answers to 3 significant figures as appropriate.
(5)  
(c) Using the result from part (a), or otherwise, find the exact value of  

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \left(\frac{\cos 2x}{\sin x} + \frac{\sin 2x}{\cos x}\right) \cot x \, dx$$





# (i) Find $\int x^2 e^x dx$ (4) (ii) Use the substitution $u = \sqrt{1-3x}$ to show that $\int \frac{27x}{\sqrt{1-3x}} dx = -2(1-3x)^{\frac{1}{2}}(Ax+B) + k$ where *A* and *B* are integers to be found and *k* is an arbitrary constant. (6)





#### **15. Numerical Methods**

(a) Prove, by expressing  $4^x$  in terms of e, that

 $\frac{d}{dx}(4^x) = 4^x \ln 4$ 

$$f(x) = \frac{4^x}{\ln 4} - \frac{x^2}{2} - 4x$$

Given that y = f(x) has a turning point at  $x = \alpha$ ,

(b) Show that  $\alpha$  is a solution of the equation:

$$x = \frac{\ln(x+4)}{\ln 4}$$

(3)

(3)

(c) Using the iteration formula

$$x_{n+1} = \frac{\ln(x_n+4)}{\ln 4}$$

With  $x_1 = 0.5$ , find:

(i) The value of  $x_3$  to three decimal places

(ii) The value of  $\alpha$ 

(d) The sketch in Figure 1(next page) shows part of the graphs of:

$$y = \frac{\ln(x+4)}{\ln 4}$$
 and  $y = x$ 

and the position of  $x_{1}$ .

On Figure 1, draw a cobweb or staircase diagram to show how convergence takes place, indicating the positions of  $x_2$  and  $x_3$  on the *x*-axis.

(2)

(3)

(e) In fact, f(x) has two turning points, one at  $x = \alpha$  and another at  $x = \beta$ 

By constructing an alternative iterative formula, and using an apprporiate starting value, show that  $\beta = -3.996$  to three decimal places.

(3)













Congratulations on completing the paper! I hope it has helped you with your revision.



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