

Midterm Exam Paper November 2021

Grade AS

Subject Pure Mathematics

Paper Name Paper 3

Duration 1 hour

Student's Information

Name (Pinyin)	English Name	Class	Group

Instructions

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Do **not** use an erasable pen or correction fluid.
- Write your answer to each question in the space provided.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- You are reminded of the need for clear representation in your answers.

Information:

- \bullet The total mark for this paper is 47.
- The number of marks for each question or part question is shown in brackets [].

1.	Use logarithms to solve the equation $4^{3x-1}=3(5^x)$, giving your answer correct to 3 decimal places.
	[4]

2.	Solve the inequality $ x-3 >2 x+1 $.	[4]

Snowing all necessary working, solve the equation $2\log_2 x = 3 + \log_2(x+1)$, giving your answered to 3 significant figures.	5wer [5]

Prove the identity $\cos 4\theta + 4\cos 2\theta \equiv 8\cos^4\theta - 3$.	[4]

(ii)	Hence solve the equation $\cos 4\theta + 4\cos 2\theta = 1$ for $-\frac{1}{2}\pi \leqslant \theta \leqslant \frac{1}{2}\pi$.	[3]

(i)	Find the values of a and b .	

(ii) When a and b have these values, factorise $p(x)$ completely.	[3]

)	$\sqrt{6}\cos\theta + \sqrt{10}\sin\theta = -4,$	[2
	$\sqrt{6}\cos\frac{1}{2}\theta + \sqrt{10}\sin\frac{1}{2}\theta = 3$	
	$\sqrt{6}\cos\frac{1}{2}\theta + \sqrt{10}\sin\frac{1}{2}\theta = 3,$	[4
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(ii) Hence, in each of the following cases, find the smallest positive angle θ which satisfies the

7. Let $f(x) = \frac{5x^2 + x + 6}{(3 - 2x)(x^2 + 4)}$.	
(i) Express $f(x)$ in partial fractions.	[5]

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