

Wednesday 22 June 2022 - Afternoon

A Level Further Mathematics A

Y544/01 Discrete Mathematics

Printed Answer Booklet

Time allowed: 1 hour 30 minutes

You must have:

- Question Paper Y544/01 (inside this document)
- the Formulae Booklet for A Level Further Mathematics A
- · a scientific or graphical calculator



/ Please write clea	arly in	black	k ink.	Do no	ot writ	e in the barcodes.			
Centre number						Candidate number			
First name(s)									
Last name									

INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided in the Printed Answer Booklet. If you need extra space use the lined pages at the end of the Printed Answer Booklet. The question numbers must be clearly shown.
- Answer all the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.
- Give non-exact numerical answers correct to **3** significant figures unless a different degree of accuracy is specified in the question.
- The acceleration due to gravity is denoted by $g \, \mathrm{m} \, \mathrm{s}^{-2}$. When a numerical value is needed use g = 9.8 unless a different value is specified in the question.

INFORMATION

- The total mark for this paper is 75.
- The marks for each question are shown in brackets [].
- This document has 16 pages.

ADVICE

Read each question carefully before you start your answer.



2 BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

1(a)	
1(b)	
1(0)	
1(c)	

2(a)		
2(b)		
	Minimum project completion time =	minutes
2(c)		

3(a)	
3(b)	
3(c)	
3(d)	
3(e)	

4(a)	
4(b)	
, ,	
4(c)	
1(0)	
4(d)	

4(e)	$\begin{array}{c} A \\ C \\ E \end{array}$
	Output:
4(f)	
4(g)	

5(a)						
				Player 2		
			X	Y	Z	
	_	A	(6, 0)	(1, 7)	(5, 6)	
	Player 1	В	(9, 4)	(2, 6)	(8, 1)	
	_	С	(6, 8)	(1, 3)	(7, 2)	
	Play-safe strategy for p	layer 1 is				
	Play-safe strategy for p	layer 2 is				
5(b)						
-						
5(c)				Player 2		
	_		X	Y	Z	
	_	A	X (6, 0)	I.	Z (5, 6)	
	Player 1	A B		Y		
	Player 1		(6, 0)	Y (1, 7)	(5, 6)	
	Player 1	В	(6, 0) (9, 4)	Y (1, 7) (2, 6)	(5, 6) (8, 1)	
	Player 1	В	(6, 0) (9, 4)	Y (1, 7) (2, 6)	(5, 6) (8, 1)	
	Player 1	В	(6, 0) (9, 4)	Y (1, 7) (2, 6)	(5, 6) (8, 1)	
	Player 1	В	(6, 0) (9, 4)	Y (1, 7) (2, 6)	(5, 6) (8, 1)	
	Player 1	В	(6, 0) (9, 4)	Y (1, 7) (2, 6)	(5, 6) (8, 1)	
	Player 1	В	(6, 0) (9, 4)	Y (1, 7) (2, 6)	(5, 6) (8, 1)	

5(d)(i)		
	<i>p</i> =	
5(d)(ii)		
	Player	expects to win the greater number of points when player 1 chooses B

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(i)									
	P	x	у	z	S	t	и	RHS	
			-						
		1	1			1	1		
(ii)									
-									
	P	x	у	Z	S	t	и	RHS	
			I	l		I			
-									
	Spare table	au (if requi	red)						
	P	x	у	Z	S	t	и	RHS	

6(b)(i)	
6(b)(ii)	x =
	y =
	z =
6(b)(iii)	
6(c)	
6(d)	

7(a) 7(b)		A	C	•	F	
		В	D	•	• G	
			E	•		
	В	С	D	Е	F	G
7(c)						

7(d)	
	seconds
7(e)(i)	
/(c)(i)	
	Lower bound = metres
7(e)(ii)	
/(c)(n)	
	Upper bound = metres
7(e)(iii)	
	Longth of about a gaild storm —
	Length of shortest possible tour = metres

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ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).



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