

Please write clearly in block capitals.

Centre number

--	--	--	--	--

Candidate number

--	--	--	--

Surname _____

Forename(s) _____

Candidate signature _____

INTERNATIONAL A-LEVEL FURTHER MATHEMATICS

(9665/FM04) Unit FS2 – Further Statistics

Monday 24 June 2019 07:00 GMT Time allowed: 1 hour 30 minutes

Materials

- For this paper you must have the Oxford International AQA booklet of formulae and statistical tables (enclosed).
- You may use a graphics calculator.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.

Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- Show all necessary working; otherwise marks may be lost.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	



3 (b) The random variables X_1 and X_2 are independent.

Given that $\lambda_1 = 2$ and $\lambda_2 = 3$, find the moment generating function of $X_1 + X_2$

Simplify your answer.

[2 marks]

3 (c) Describe the distribution of $X_1 + X_2$

[1 mark]

— 7

Turn over for the next question

Turn over ►



4 The following table shows the contents of a bag of coins.

Coin (cents)	10	20	50
Frequency	25	55	20

4 (a) Find the mean μ of the value of the coins in the bag.

[1 mark]

4 (b) A random sample of two coins is selected from the bag in the following way.

Step 1: A first coin is taken randomly from the bag, its value is recorded and then the coin is put back into the bag.

Step 2: A second coin is taken randomly from the bag, its value is recorded and then the coin is put back into the bag.

For example, a 10 cent coin followed by a 20 cent coin is recorded as (10, 20).

4 (b) (i) Write down all the distinct possible samples.

[2 marks]



7 (c) (ii) Sean and Millie each carry out a hypothesis test on the mean monthly milk production with the following hypotheses

$$H_0: \mu = 890$$

$$H_1: \mu \neq 890$$

Sean and Millie each use their confidence interval to carry out the test.

State whether Sean and Millie reach the same conclusion.

Explain your answer.

[2 marks]

15

Turn over for the next question

Turn over ►



8 (b) State the assumption required for the test in part (a) to be valid.

[1 mark]

Turn over for the next question

Turn over ►



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

Copyright information

For confidentiality purposes, acknowledgements of third-party copyright material are published in a separate booklet rather than including them on the examination paper or support materials. This booklet is published after each examination series and is available for free download from www.oxfordaqaexams.org.uk after the live examination series.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and Oxford International AQA Examinations will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team, AQA, Stag Hill House, Guildford, GU2 7XJ.

Copyright © 2019 Oxford International AQA Examinations and its licensors. All rights reserved.



2 4



1 9 6 X F M 0 4

IB/M/Jun19/FM04