



ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2018

Centre Number

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Candidate Number

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Mathematics

Assessment Unit S1

assessing

Module S1: Statistics 1



AMS11

[AMS11]

THURSDAY 17 MAY, AFTERNOON

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer **all seven** questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Questions which require drawing or sketching should be completed using an H.B. pencil.

All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions. **Answers without working may not gain full credit.**

Answers should be given to three significant figures unless otherwise stated.

You are permitted to use a graphic or scientific calculator in this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 75

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

A copy of the **Mathematical Formulae and Tables booklet** is provided.

Throughout the paper the logarithmic notation used is $\ln z$ where it is noted that $\ln z \equiv \log_e z$

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24AMS1101

1 Cartons of eggs contain 10 eggs.
Following an unusually bumpy journey to the supermarket, the probability that an egg is cracked is 0.22
A carton of eggs is chosen at random.

(i) Find the probability that exactly 3 eggs are cracked.

6]

(ii) Find the probability that at most 3 eggs are cracked.

67



(iii) Find the probability that at least 3 eggs are cracked.

[3]

[Turn over



2 The number of years of service of all the employees at a large department store are summarised in **Table 1** below.

Table 1

Number of years, x	$0 \leq x < 5$	$5 \leq x < 10$	$10 \leq x < 15$	$15 \leq x < 20$	$20 \leq x < 30$	$30 \leq x < 40$
Number of employees	16	28	22	13	9	5

(i) Calculate estimates for the mean and standard deviation number of years of service.

61



A rival department store's employees have mean years of service 9.5 years and standard deviation 6.2 years.

(ii) Briefly compare the results for the two stores.

[2]



3 The number of misprints in a 24-page newspaper was found to be 84
Model the distribution of misprints by a Poisson distribution.

(i) Find the probability that there are exactly 3 misprints on page 17

(ii) Find the probability that on the two centre pages, there are at least 6 misprints. [5]



(iii) State two assumptions you have made about the misprints. [2]

[Turn over



4 A biased die is being used for a board game.
The probability distribution of the score on the die is given in **Table 2** below.

Table 2

x	1	2	3	4	5	6
$P(X=x)$	0.15	0.19	0.13	b	0.14	0.19

(i) Find b . [2]

(ii) Find $P(X = \text{prime number})$. [2]



(iii) Find $E(X)$.

[2]

(iv) Find $\text{Var}(X)$.

[4]

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[Turn over



24AMS1109

5 Fig. 1 below shows the graph of a continuous random variable X .

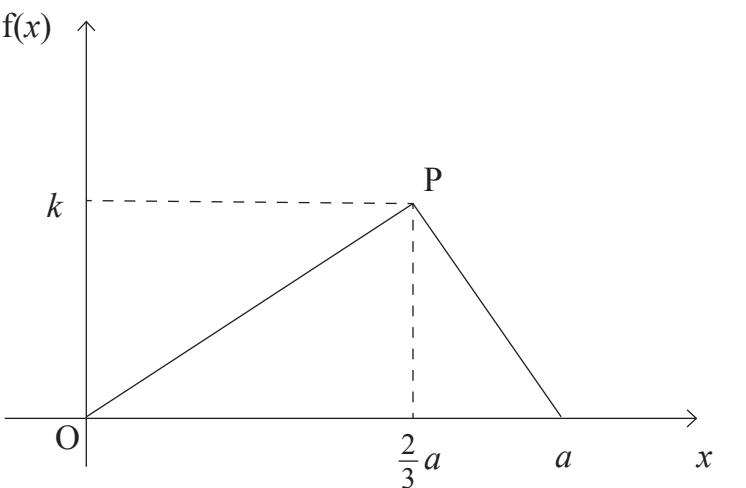


Fig. 1

(i) Find the value of $a \times k$. [2]

(ii) Given that the value of a is 6, find the equation of OP. [4]



[Turn over]

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24AMS1111

(iii) Find $P(X < 4)$.

2]

(iv) Find $P(X > 1)$.

4]



[Turn over]

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24AMS1113

Normal distribution values should be read from the tables provided.

6 The masses of salmon bred in a fish farm are normally distributed with mean 1500 grams and standard deviation 100 grams.

(i) Find the percentage of salmon whose mass is more than 1700 grams.

5]



(ii) Find the percentage of salmon whose mass is between 1450 grams and 1600 grams. [4]

[Turn over

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The lightest 5% of the salmon are kept for canning.

(iii) Find the maximum mass of salmon kept for canning.

4]



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24AMS1117

7 In a survey about preferences of beverages:

20% of tea drinkers also drank coffee,
25% of coffee drinkers also drank tea,
36% of those surveyed drank neither tea nor coffee.

The probability that someone drinks both tea and coffee is p .

(i) Find p .

5

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One of those surveyed is chosen at random.

(ii) Find the probability that they drink coffee.

[1]

(iii) Find the probability that they do not drink tea.

[2]

[Turn over



(iv) Find the probability that they drink coffee if they don't drink tea.

4]



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For Examiner's use only	
Question Number	Marks
1	
2	
3	
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5	
6	
7	

Total Marks	
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Examiner Number

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