

## **Cambridge International Examinations**

Cambridge International Advanced Level

Candidates ans	wer on tl	ne Quest	ion Pa	per.						
							1	hour	15 m	inutes
Paper 7 Probab	oility & S	tatistics 2	(S2)				Feb	ruary	/Marc	h 2017
MATHEMATICS	}								97	09/72
NUMBER						NUMBER				
CENTRE						CANDIDATE				
CANDIDATE NAME										

## **READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name in the spaces at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all the questions.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

The use of an electronic calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.





This document consists of 11 printed pages and 1 blank page.

proportion of voter	rs in Hungton who	o would vote for	the Alpha party	у.	[
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	Given that Karim's test is two-tail, state the alternative hypothesis.	
Kari	m finds that the value of the test statistic is $z = 2.43$ .	
(ii)	Explain what conclusion he should draw.	
		•••••
		•••••
		•••••
(iii)	Explain briefly when a one-tail test is appropriate, rather than a two-tail test.	

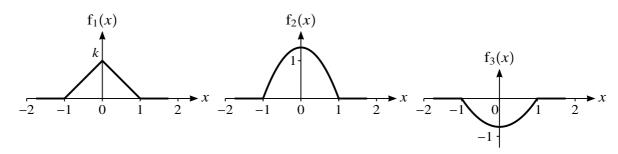
(i)	Find P(51 $< \overline{X} < 53$ ).
<b>::</b> \	Explain why it was necessary to use the Central Limit theorem in the solution to part (i).
11)	Explain why it was necessary to use the central Ellint theorem in the solution to part (1).

4

At a doctors' surgery, the number of missed appointments per day has a Poisson distribution. In the

than	ager carries out a hypothesis test to determine whether this mean has decreased. If there are few 3 missed appointments in a randomly chosen 5-day period, she will conclude that the mean heased.
<b>(i)</b>	Find the probability of a Type I error.
( <b>ii</b> )	State what is meant by a Type I error in this context.
(iii)	Find the probability of a Type II error if the mean number of missed appointments per day is 0

5 (a)



The diagram shows the graphs of three functions,  $f_1$ ,  $f_2$  and  $f_3$ . The function  $f_1$  is a probability density function.

(i)	State the value of $k$ .	[1]
(ii)	For each of the functions $f_2$ and $f_3$ , state why it cannot be a probability density	function. [2]
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<b>(b)</b>	The	probability	density	function	g is	defined	bv
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$$g(x) = \begin{cases} 6(a^2 - x^2) & -a \le x \le a, \\ 0 & \text{otherwise,} \end{cases}$$

where a is a constant.

(i)	Show that $a = \frac{1}{2}$ .	[3]
(ii)	State the value of $E(X)$ .	[1]
(iii)	Find $Var(X)$ .	[2]

 $N(62.0, 10.0^2)$ respectively.
The standard load for a certain crane is 8 cartons of sugar and 3 cartons of flour. The maximum load that can be carried safely by the crane is 900 kg. Stating a necessary assumption, find the percentage of standard loads that will exceed the maximum safe load. [5]

C	chosen carton of flour.
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(i)	Stat	e two assumptions required for the Poisson model to be valid in this context.
	•••••	
	•••••	
(ii)	(a)	Find the probability that the number of planes arriving in a 15-minute period is greater 1 and less than 4,
	<b>a</b> >	
	(b)	Find the probability that more than 3 planes will arrive in a 40-minute period.

the planes that land.

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