

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Friday 12 June 2020

Afternoon (Time: 1 hour 30 minutes)

Paper Reference **WST02/01**

Mathematics

International Advanced Subsidiary/Advanced Level
Statistics S2

You must have:

Mathematical Formulae and Statistical Tables (Blue), calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Values from the statistical tables should be quoted in full. If a calculator is used instead of the tables, the value should be given to an equivalent degree of accuracy.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 6 questions in this question paper. The total mark for this paper is 75.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

P65762A

©2020 Pearson Education Ltd.

1/1/1/



Pearson

Question 1 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Question 1 continued

Lined area for writing the answer to Question 1.



DO NOT WRITE IN THIS AREA

Leave
blank

Question 1 continued

Lined area for writing the answer to Question 1.

(Total 8 marks)

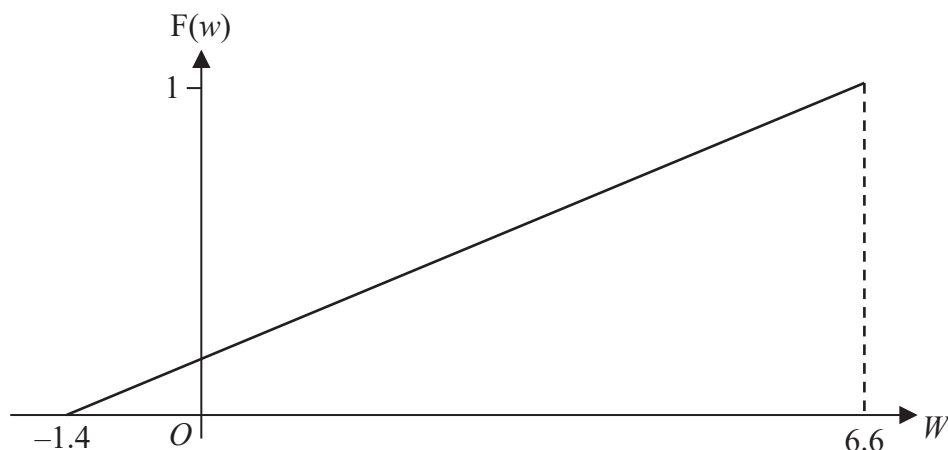
Q1



2. In the summer Kylie catches a local steam train to work each day. The published arrival time for the train is 10 am.

The random variable W is the train's actual arrival time minus the published arrival time, in minutes. When the value of W is positive, the train is late.

The cumulative distribution function $F(w)$ is shown in the sketch below.



- (a) Specify fully the probability density function $f(w)$ of W . (2)
- (b) Write down the value of $E(W)$ (1)
- (c) Calculate α such that $P(\alpha \leq W \leq 1.6) = 0.35$ (2)

A day is selected at random.

- (d) Calculate the probability that on this day the train arrives between 1.2 minutes late and 2.4 minutes late. (2)

Given that on this day the train was between 1.2 minutes late and 2.4 minutes late,

- (e) calculate the probability that it was more than 2 minutes late. (2)

A random sample of 40 days is taken.

- (f) Calculate the probability that for at least 10 of these days the train is between 1.2 minutes late and 2.4 minutes late. (3)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 2 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Question 2 continued

Lined area for writing the answer to Question 2.



DO NOT WRITE IN THIS AREA

Leave
blank

Question 2 continued

Lined area for writing the answer to Question 2.

(Total 12 marks)

Q2	
----	--



- (4)

Question 3 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 3 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 3 continued

Lined area for writing the answer to Question 3 continued.

(Total 15 marks)

Q3



4. In a peat bog, Common Spotted-orchids occur at a mean rate of 4.5 per m^2

- (a) Give an assumption, not already stated, that is required for the number of Common Spotted-orchids per m^2 of the peat bog to follow a Poisson distribution. (1)

Given that the number of Common Spotted-orchids in 1 m^2 of the peat bog can be modelled by a Poisson distribution,

- (b) find the probability that in a randomly selected 1 m^2 of the peat bog
- (i) there are exactly 6 Common Spotted-orchids,
- (ii) there are fewer than 10 but more than 4 Common Spotted-orchids. (4)

Juan believes that by introducing a new management scheme the number of Common Spotted-orchids in the peat bog will increase. After three years under the new management scheme, a randomly selected 2 m^2 of the peat bog contains 11 Common Spotted-orchids.

- (c) Using a 5% significance level assess Juan's belief. State your hypotheses clearly. (5)

Assuming that in the peat bog, Common Spotted-orchids still occur at a mean rate of 4.5 per m^2

- (d) use a normal approximation to find the probability that in a randomly selected 20 m^2 of the peat bog there are fewer than 70 Common Spotted-orchids. (3)

Following a period of dry weather, the probability that there are fewer than 70 Common Spotted-orchids in a randomly selected 20 m^2 of the peat bog is 0.012

A random sample of 200 non-overlapping 20 m^2 areas of the peat bog is taken.

- (e) Using a suitable approximation, calculate the probability that at most 1 of these areas contains fewer than 70 Common Spotted-orchids. (3)



Question 4 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 4 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 4 continued

Lined area for writing the answer to Question 4.

(Total 16 marks)

Q4



Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 5 continued

DO NOT WRITE IN THIS AREA

Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Lined area for writing the answer to Question 5.

Q5

--	--

(Total 13 marks)



Question 6 continued

Handwriting practice area with 30 horizontal lines.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

--	--

TOTAL FOR PAPER: 75 MARKS

END