Edexcel GCE
Statistics S1
Silver Level S4
(Question Paper)

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Paper Reference(s)

6683/01

Edexcel GCE

Statistics S1

Silver Level S4

Time: 1 hour 30 minutes

Materials required for examination papers	**Items included with question**
Mathematical Formulae (Green)	Nil

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulas stored in them.

Instructions to Candidates

Write the name of the examining body (Edexcel), your centre number, candidate number, the unit title (Statistics S1), the paper reference (6683), your surname, initials and signature.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
There are 7 questions in this question paper. The total mark for this paper is 75.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the Examiner. Answers without working may gain no credit.

Suggested grade boundaries for this paper:

A*	A	B	C	D	E
62	55	48	41	36	29

1. The histogram in Figure 1 shows the time, to the nearest minute, that a random sample of 100 motorists were delayed by roadworks on a stretch of motorway.

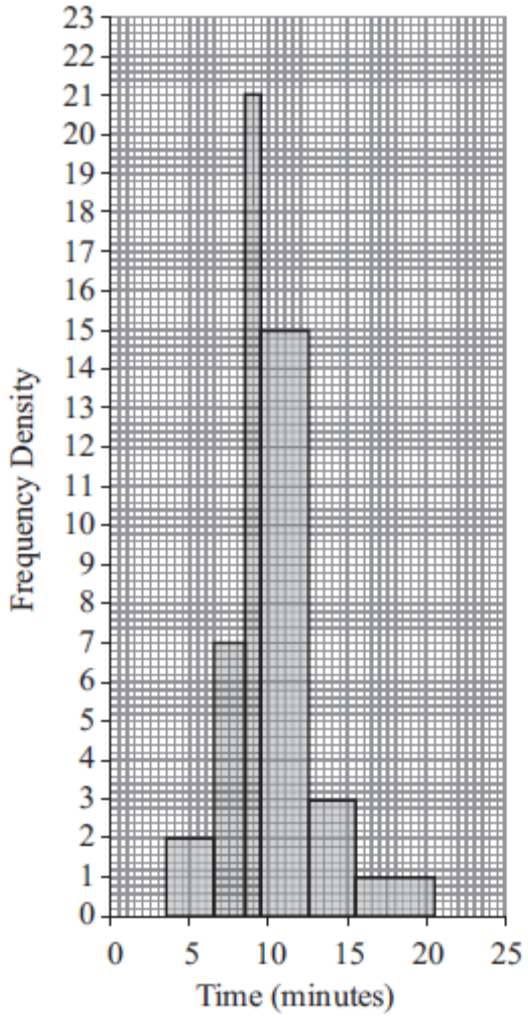

Figure 1

(a) Complete the table.

Delay (minutes)	Number of motorists
4 – 6	6
7 – 8	
9	21
10 – 12	45
13 – 15	9
16 – 20	

(2)

(*b*) Estimate the number of motorists who were delayed between 8.5 and 13.5 minutes by the roadworks.

(2)

January 2012

2. When Rohit plays a game, the number of points he receives is given by the discrete random variable X with the following probability distribution.

x	0	1	2	3
$P(X = x)$	0.4	0.3	0.2	0.1

(*a*) Find $E(X)$.

(2)

(*b*) Find $F(1.5)$.

(2)

(*c*) Show that $\text{Var}(X) = 1$.

(4)

(*d*) Find $\text{Var}(5 - 3X)$.

(2)

Rohit can win a prize if the total number of points he has scored after 5 games is at least 10. After 3 games he has a total of 6 points. You may assume that games are independent.

(*e*) Find the probability that Rohit wins the prize.

(6)

January 2009

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3. A survey of the reading habits of some students revealed that, on a regular basis, 25% read quality newspapers, 45% read tabloid newspapers and 40% do not read newspapers at all.

(*a*) Find the proportion of students who read both quality and tabloid newspapers.

(3)

(*b*) Draw a Venn diagram to represent this information.

(3)

A student is selected at random. Given that this student reads newspapers on a regular basis,

(*c*) find the probability that this student only reads quality newspapers.

(3)

June 2007

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4. A survey of 100 households gave the following results for weekly income £y.

Income y (£)	Mid-point	Frequency f
$0 \leq y < 200$	100	12
$200 \leq y < 240$	220	28
$240 \leq y < 320$	280	22
$320 \leq y < 400$	360	18
$400 \leq y < 600$	500	12
$600 \leq y < 800$	700	8

(You may use $\sum fy^2 = 12\,452\,800$)

A histogram was drawn and the class $200 \leq y < 240$ was represented by a rectangle of width 2 cm and height 7 cm.

(a) Calculate the width and the height of the rectangle representing the class $320 \leq y < 400$.

(3)

(b) Use linear interpolation to estimate the median weekly income to the nearest pound.

(2)

(c) Estimate the mean and the standard deviation of the weekly income for these data.

(4)

One measure of skewness is $\dfrac{3(\text{mean} - \text{median})}{\text{standard deviation}}$.

(d) Use this measure to calculate the skewness for these data and describe its value.

(2)

Katie suggests using the random variable X which has a normal distribution with mean 320 and standard deviation 150 to model the weekly income for these data.

(e) Find $P(240 < X < 400)$.

(2)

(f) With reference to your calculations in parts (d) and (e) and the data in the table, comment on Katie's suggestion.

(2)

January 2013

5. Jake and Kamil are sometimes late for school.
The events J and K are defined as follows

J = the event that Jake is late for school,
K = the event that Kamil is late for school.

$P(J) = 0.25$, $P(J \cap K) = 0.15$ and $P(J' \cap K') = 0.7$.

On a randomly selected day, find the probability that

(*a*) at least one of Jake or Kamil are late for school,

(1)

(*b*) Kamil is late for school.

(2)

Given that Jake is late for school,

(*c*) find the probability that Kamil is late.

(3)

The teacher suspects that Jake being late for school and Kamil being late for school are linked in some way.

(*d*) Determine whether or not J and K are statistically independent.

(2)

(*e*) Comment on the teacher's suspicion in the light of your calculation in part (*d*).

(1)

May 2011

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6. A manufacturer fills jars with coffee. The weight of coffee, W grams, in a jar can be modelled by a normal distribution with mean 232 grams and standard deviation 5 grams.

(*a*) Find $P(W < 224)$.

(3)

(*b*) Find the value of w such that $P(232 < W < w) = 0.20$.

(4)

Two jars of coffee are selected at random.

(*c*) Find the probability that only one of the jars contains between 232 grams and w grams of coffee.

(3)

January 2012

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7. The weight, X grams, of soup put in a tin by machine A is normally distributed with a mean of 160 g and a standard deviation of 5 g.

A tin is selected at random.

(a) Find the probability that this tin contains more than 168 g.

(3)

The weight stated on the tin is w grams.

(b) Find w such that $P(X < w) = 0.01$.

(3)

The weight, Y grams, of soup put into a carton by machine B is normally distributed with mean μ grams and standard deviation σ grams.

(c) Given that $P(Y < 160) = 0.99$ and $P(Y > 152) = 0.90$, find the value of μ and the value of σ.

(6)

January 2011

TOTAL FOR PAPER: 75 MARKS

END