Paper Reference(s)

6683

Edexcel GCE

Statistics S1

Advanced Subsidiary

Specimen Paper

Time: 1 hour 30 minutes

Materials required for examination
Answer Book (AB16)
Mathematical Formulae (Lilac)
Graph Paper (ASG2)

Items included with question papers
Nil

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may NOT use calculators such as the Texas Instruments TI 89, TI 92, Casio CFX 9970G, Hewlett Packard HP 48G.

Instructions to Candidates

In the boxes on the answer book, write the name of the examining body (Edexcel), your centre number, candidate number, the unit title (Statistics S1), the paper reference (6683), your surname, other name and signature.
When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
This paper has eight questions.

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.

1. (*a*) Explain what you understand by a statistical model.

(2)

(*b*) Write down a random variable which could be modelled by

(i) a discrete uniform distribution,

(ii) a normal distribution.

(2)

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2. A group of students believes that the time taken to travel to college, T minutes, can be assumed to be normally distributed. Within the college 5% of students take at least 55 minutes to travel to college and 0.1% take less than 10 minutes.

Find the mean and standard deviation of T.

(9)

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3. The discrete random variable X has probability function

$$\mathrm{P}(X = x) = \begin{cases} kx, & x = 1, 2, 3, 4, 5, \\ 0, & \text{otherwise.} \end{cases}$$

(*a*) Show that $k = \frac{1}{15}$.

(3)

Find the value of

(*b*) $\mathrm{E}(2X + 3)$,

(5)

(*c*) $\mathrm{Var}(2X - 4)$.

(6)

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4. A drilling machine can run at various speeds, but in general the higher the speed the sooner the drill needs to be replaced. Over several months, 15 pairs of observations relating to speed, s revolutions per minute, and life of drill, h hours, are collected.

For convenience the data are coded so that $x = s - 20$ and $y = h - 100$ and the following summations obtained.

$\Sigma x = 143;\ \Sigma y = 391;\ \Sigma x^2 = 2413;\ \Sigma y^2 = 22441;\ \Sigma xy = 484.$

(*a*) Find the equation of the regression line of h on s.

(10)

(*b*) Interpret the slope of your regression line.

(2)

Estimate the life of a drill revolving at 30 revolutions per minute.

(2)

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5. (*a*) Explain briefly the advantages and disadvantages of using the quartiles to summarise a set of data.

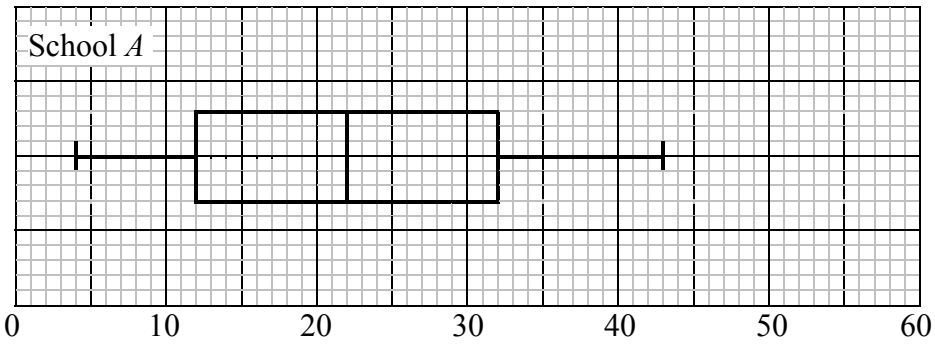
(4)

(*b*) Describe the main features and uses of a box plot.

(3)

The distances, in kilometres, travelled to school by the teachers in two schools, *A* and *B*, in the same town were recorded. The data for School *A* are summarised in Diagram 1.

Diagram 1



For School *B*, the least distance travelled was 3 km and the longest distance travelled was 55 km. The three quartiles were 17, 24 and 31 respectively.

An outlier is an observation that falls either 1.5 × (interquartile range) above the upper quartile or 1.5 × (interquartile range) below the lower quartile.

(*c*) Draw a box plot for School *B*.

(5)

(*d*) Compare and contrast the two box plots.

(4)

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6. For any married couple who are members of a tennis club, the probability that the husband has a degree is $\frac{3}{5}$ and the probability that the wife has a degree is $\frac{1}{2}$. The probability that the husband has a degree, given that the wife has a degree, is $\frac{11}{12}$.

A married couple is chosen at random.

(*a*) Show that the probability that both of them have degrees is $\frac{11}{24}$.

(2)

(*b*) Draw a Venn diagram to represent these data.

(5)

Find the probability that

(*c*) only one of them has a degree,

(2)

(d) neither of them has a degree.

(3)

Two married couples are chosen at random.

(*e*) Find the probability that only one of the two husbands and only one of the two wives have degrees.

(6)

END