

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
TOTAL	



General Certificate of Education  
Advanced Level Examination  
June 2015

# Statistics

# SS05

## Unit Statistics 5

Tuesday 16 June 2015 1.30 pm to 3.00 pm

**For this paper you must have:**

- the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

### Time allowed

- 1 hour 30 minutes

### Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Write the question part reference (eg (a), (b)(i) etc) in the left-hand margin.
- You must answer each question in the space provided for that question. If you require extra space, use an AQA supplementary answer book; do **not** use the space provided for a different question.
- Do not write outside the box around each page.
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- The **final** answer to questions requiring the use of tables or calculators should normally be given to three significant figures.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 75.

### Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- You do not necessarily need to use all the space provided.



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QUESTION  
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QUESTION  
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**4** Sandy is a keen cyclist who buys a new racing bicycle to compete in 15-km races. A sample of 14 of Sandy's race times, in minutes, using the new bicycle gave the following results.

24.2 23.7 26.1 23.8 22.6 24.9 22.7 27.3 25.9 26.4 23.1 25.0 25.2 24.5

Sandy's coach wishes to use this sample to construct confidence intervals for both the population variance and the population mean of Sandy's 15-km race times.

**(a) (i)** What assumption, other than that the sample of Sandy's 15-km race times is random, must be made for these confidence intervals to be valid? **[1 mark]**

**(ii)** Construct a 95% confidence interval for the population variance of Sandy's 15-km race times. **[7 marks]**

**(iii)** Construct a 95% confidence interval for the population mean of Sandy's 15-km race times. **[6 marks]**

**(b)** When using an older bicycle, Sandy's 15-km race times, in minutes, had a mean of 26.2 and a variance of 3.39.

With reference to the confidence intervals you have calculated in parts **(a)(ii)** and **(a)(iii)**, comment on Sandy's performance in 15-km races when using the new bicycle. **[3 marks]**

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QUESTION  
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- 5** Alex buys a jewellery-making kit containing beads and threads.
- (a)** There are seven colours of beads: red, yellow, pink, green, orange, purple and blue.
- Each kit contains a random sample of exactly 150 of these beads.
- The list of contents included in each kit claims that the beads are produced with colours in the ratios 5:4:3:2:4:2:5 respectively.
- Alex opens the kit and counts the number of beads of each of the seven colours. The results are given in the table.

Colour	Red	Yellow	Pink	Green	Orange	Purple	Blue
Number of beads	37	22	11	15	25	9	31

Carry out a  $\chi^2$  goodness of fit test at the 1% level of significance to investigate whether the ratios of the colours of beads in the kit bought by Alex provide evidence to support the claim stated in the list of contents.

**[8 marks]**

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QUESTION  
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QUESTION  
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**END OF QUESTIONS**

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