

Please check the examination details below before entering your candidate information

Candidate surname					Other names									
<b>Pearson Edexcel</b>					Centre Number					Candidate Number				
<b>International</b>					[ ] [ ] [ ] [ ] [ ] [ ]					[ ] [ ] [ ] [ ] [ ] [ ]				
<b>Advanced Level</b>														
<b>Thursday 21 January 2021</b>														
Morning (Time: 1 hour 30 minutes)							Paper Reference <b>WST03/01</b>							
<b>Mathematics</b>														
<b>International Advanced Subsidiary/Advanced Level</b>														
<b>Statistics S3</b>														
<b>You must have:</b> 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 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 ►

P66654A

©2021 Pearson Education Ltd.

1/1/



  
Pearson









Leave blank

3. The students in a group of schools can choose a club to join. There are 4 clubs available: Music, Art, Sports and Computers. The director collected information about the number of students in each club, using a random sample of 88 students from across the schools. The results are given in Table 1 below.

	Music	Art	Sports	Computers
No. of students	14	28	27	19

**Table 1**

The director uses a chi-squared test to determine whether or not the students are uniformly distributed across the 4 clubs.

- (a) (i) Find the expected frequencies he should use.

Given that the test statistic he calculated was 6.09 (to 3 significant figures)

- (ii) use a 5% level of significance to complete the test. You should state the degrees of freedom and the critical value used.

**(4)**

The director wishes to examine the situation in more detail and takes a second random sample of 88 students. The director assumes that within each school, students select their clubs independently. The students come from 3 schools and the distribution of the students from each school amongst the clubs is given in Table 2 below.

School \ Club	Music	Art	Sports	Computers
School A	3	10	9	8
School B	1	11	13	5
School C	11	6	7	4

**Table 2**

The director wishes to test for an association between a student's school and the club they choose.

- (b) State hypotheses suitable for such a test.

**(1)**

- (c) Calculate the expected frequency for School C and the Computers club.

**(1)**

The director calculates the test statistic to be 7.29 (to 3 significant figures) with 4 degrees of freedom.

- (d) Explain clearly why his test has 4 degrees of freedom.

**(2)**

- (e) Complete the test using a 5% level of significance and stating clearly your critical value.

**(2)**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





























