Name: _____

GCSE Statistics

Standardised Scores

Total marks available: 53

Total marks achieved: _____

Instructions
• Use black ink or ball-point pen.
• Fill in the boxes at the top of this page with your name,
Centre number and candidate number.
• Answer all questions.
• Answer the questions in the spaces provided
– There may be more space than you need.
• Scientific calculators may be used.
• You must show all your working out with your answer clearly identified
At the end of your solution.

Information
• 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.

Q1.

Adila and Brandon both travel to work each day.
Information about their past journey times, in minutes, is given in the table.

	Mean	Standard deviation
Adila	75	10
Brandon	65	4

On Monday, they each took 60 minutes to travel to work.

(a) Calculate the standardised scores for the two journey times on Monday.

Adila..

Brandon..

(3)

(b) Using your answers to part (a), explain which of Adila or Brandon had the better journey time on Monday.

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(2)

(c) Explain why standardised scores are appropriate to use in this context.

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(1)

(Total for question = 6 marks)

Q2.

The table shows information about the performance of students in a Maths examination and in a Statistics examination.

Examination	Mean mark	Standard deviation
Maths	52	10
Statistics	59	6

Freya scored 62 marks in her Statistics examination.

(a) Show that Freya's standardised score for Statistics is 0.5

Maths examination mark was 59 giving her a standardised score for Maths of 0.7

She thinks she did better in the Statistics examination than in the Maths examination.

(b) Explain whether or not Freya is correct.

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(2)

Freya also took a French examination.
She says that her mark in this examination is below average.

(c) Explain how Freya's standardised score for French can be used to confirm this.

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(1)

(Total for question = 4 marks)

Q3.

The table shows the results in two events of the women's heptathlon for Jessica Ennis-Hill in the 2015 World Championships.

The mean and standard deviation for each of these two events for all the athletes who completed the heptathlon are also given.

	Jessica Ennis-Hill	Mean	Standard deviation
Long Jump (metres)	6.43	6.10	0.26
High Jump (metres)	1.86	1.79	0.066

(Source: *iaaf.org*)

(a)   Use standardised scores for this information to compare Jessica Ennis-Hill's performance in the Long Jump with her performance in the High Jump.

Explain how you reach your conclusion.

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(5)

The table below shows Jessica Ennis-Hill's result for the Javelin Throw.

It also shows information about the mean and the standard deviation for this event of all the athletes who completed the heptathlon.

	Jessica Ennis-Hill	Mean	Standard deviation
Javelin Throw (metres)	42.51	x	5.85

Jessica Ennis-Hill's standardised score for the Javelin Throw was – 0.32

(b)   Work out the value of *x*.

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(2)

(Total for question = 7 marks)

Q4.

To apply for a job at a bank, an applicant must first take a numeracy test.

The table gives information about the results of the test taken by all applicants.

Mean	Standard deviation
55	8

To get an interview, an applicant must score a standardised score of at least 1.5 for the test.

Mithra scored 68 in the test.

(a) Determine whether or not Mithra gets an interview.

(3)

Alexi's standardised score for the test is –1.25

Fiona's standardised score for the test is –1

(b) Compare Alexi's performance in the test with Fiona's performance in the test.
Give a reason for your answer.

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(2)

(Total for question = 5 marks)

Q5.

The table gives the time that Lena took to complete successfully each of two skills tests, test A and test B.

The mean and the standard deviation for each of these tests for all the students who completed the tests are also given.

	Lena	All students	
		Mean	Standard deviation
Test A (minutes)	16.3	14.4	1.5
Test B (minutes)	21.6	19.8	2.4

Using standardised scores, compare Lena's performance in Test A relative to the other students with her performance in Test B relative to the other students.
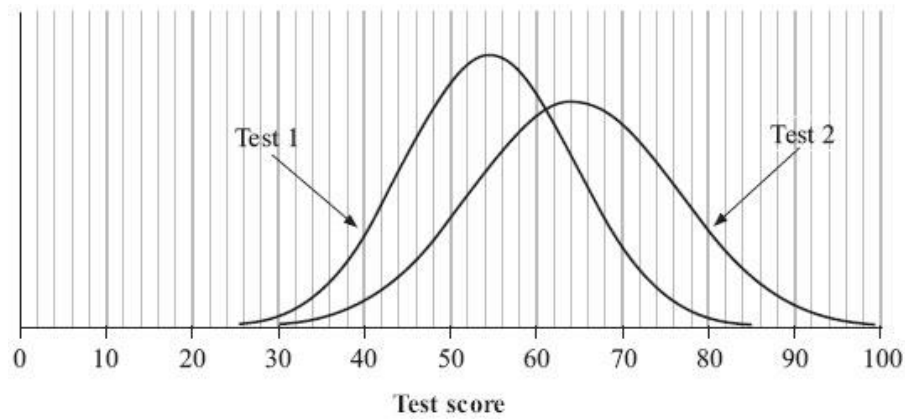
Explain how you reach your conclusion.

(5)

(Total for question = 5 marks)

Q6.

Some students did two mathematics tests.
 The students' marks for the tests are normally distributed.
 The diagram shows the distribution of marks for Test 1 and Test 2

Test score

(a) Estimate the mean and standard deviation of the marks for Test 1

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(3)

For Test 2 the mean mark is 64 and the standard deviation is 12

One student got 60 marks on both Test 1 and Test 2

(b) Find this student's standardised scores and compare how well the student did on the two tests.

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(5)

(Total for Question is 8 marks)

Q7.

In the 2015 Women's European Gymnastics Championships, two of the events were the vault and the balance beam.

Jeff thinks the scores may be modelled by normal distributions.

For the vault, the competitors' mean score was 14.5 and the standard deviation was 0.6

Source: European Union of Gymnastics

One competitor scored 14.1 in the vault.

(a)   Calculate the standardised score for this competitor.

Give your answer correct to 1 decimal place.

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(2)

The same competitor had a standardised score of 0.5 for the balance beam.

(b)   Compare the performance of this competitor in the vault with her performance in the balance beam.

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(2)

The highest score in the vault was 15.3

(c) Use standardised scores to discuss whether or not the scores in the vault may be modelled by a normal distribution.

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(3)

(Total for question = 7 marks)

Q8.

Kirstin took tests in Maths, in Physics and in French.

The table shows information about the marks of all students who took the tests.

	Maths	Physics	French
Mean	53	69	48
Standard deviation	8	10	6

Kirstin scored 63 marks in Maths.

(a) Show that Kirstin's standardised score in Maths is 1.25

(1)

Kirstin scored 78 marks in Physics.

(b) Work out whether Kirstin did better in Maths or in Physics.
 You must explain your answer.

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(3)

Kirstin's standardised score in French was –0.5

(c) Work out Kirstin's mark in French.

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(2)

(Total for question = 6 marks)

Q9. The table gives the standardised scores for Brinn Bevan in three of the gymnastic apparatus used in the men's all-around final in the 2018 Artistic Gymnastics World Championships.

Apparatus	Floor exercise	Pommel horse	Rings
Standardised score	0.763	−0.938	−0.0169

(Source: *worldgymdoha18.com*)

(a) Use the standardised scores to compare Brinn Bevan's performances **relative to the other competitors** in the floor exercise, in the pommel horse and in the rings.

Give reasons for your comparisons.

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(2)

The raw score for each apparatus is also known.
Each apparatus had the same maximum raw score.

(b) Explain why it is appropriate to use standardised scores rather than raw scores to compare performances.

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(1)

The table below shows Brinn Bevan's standardised score for the parallel bars.

It also shows the mean and the standard deviation of the number of points awarded in the parallel bars to all the gymnasts who completed the men's all-around final.

	Standardised score	Mean	Standard deviation
Parallel bars	0.247	14.389	0.854

(Source: *worldgymdoha18.com*)

(c) Work out the number of points awarded to Brinn Bevan for the parallel bars.

Give your answer correct to one decimal place.

.... (2)

(Total for question = 5 marks)