

91037



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

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SUPERVISOR'S USE ONLY

# Level 1 Mathematics and Statistics, 2014

## 91037 Demonstrate understanding of chance and data

9.30 am Tuesday 18 November 2014  
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of chance and data.	Demonstrate understanding of chance and data, justifying statements and findings.	Demonstrate understanding of chance and data, showing statistical insight.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL the questions in this booklet.**

Show ALL working.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

**TOTAL**

ASSESSOR'S USE ONLY

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**QUESTION ONE: BASKETBALL SHOTS**

- (a) Levi has been wondering about how good he is at basketball.  
Levi thinks that his probability of scoring is 50% since he can either miss or score on the shot.

- (i) Do you agree?

Explain your answer using probability ideas.

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- (ii) Levi's father says that, when he was the same age, his chance of scoring was 60%.

If Levi's father had taken 200 shots when he was the same age, how many shots would he have scored on?

Explain your answer clearly.

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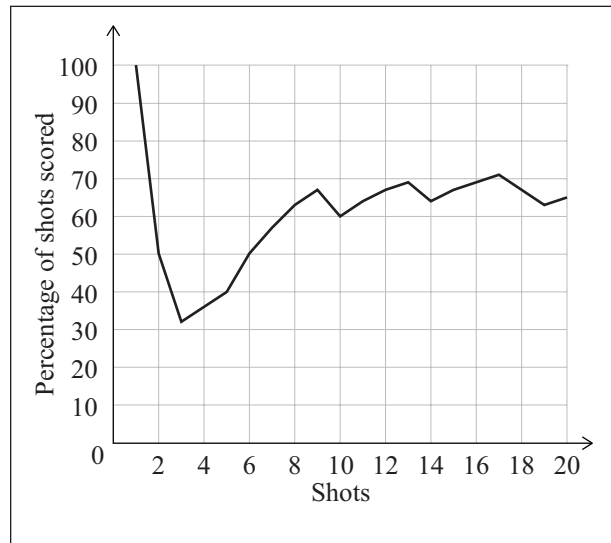
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- (b) Levi begins an experiment. He takes some shots and records whether he scores or he misses. His results are listed below, together with the graph he drew.

Shot	Result	Total scored	Percentage of shots scored
1	Scored	1	100
2	Missed	1	50
3	Missed	1	33
4	Missed	1	
5	Scored	2	40
6	Scored	3	50
7	Scored	4	57
8	Scored	5	63
9	Scored	6	67
10	Missed	6	60
11	Scored	7	64
12	Scored	8	67
13	Scored	9	69
14	Missed	9	64
15	Scored	10	67
16	Scored	11	69
17	Scored	12	71
18	Missed	12	67
19	Missed	12	63
20	Scored	13	65



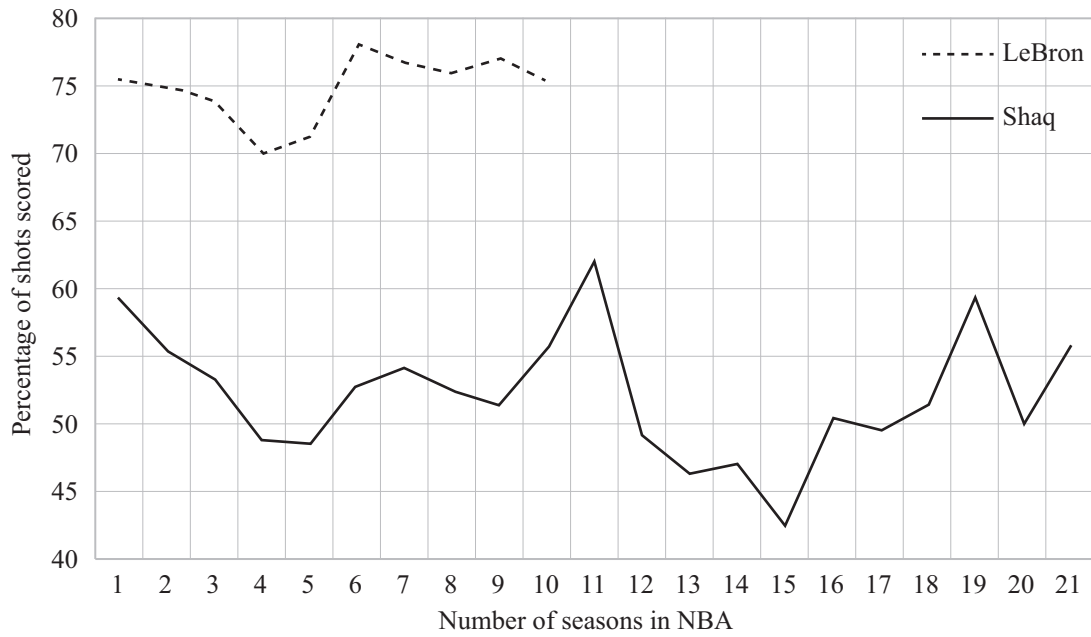
- (i) Levi forgot to plot the percentage of shots scored on after 4 shots. Complete the table and change the graph above to show this data.



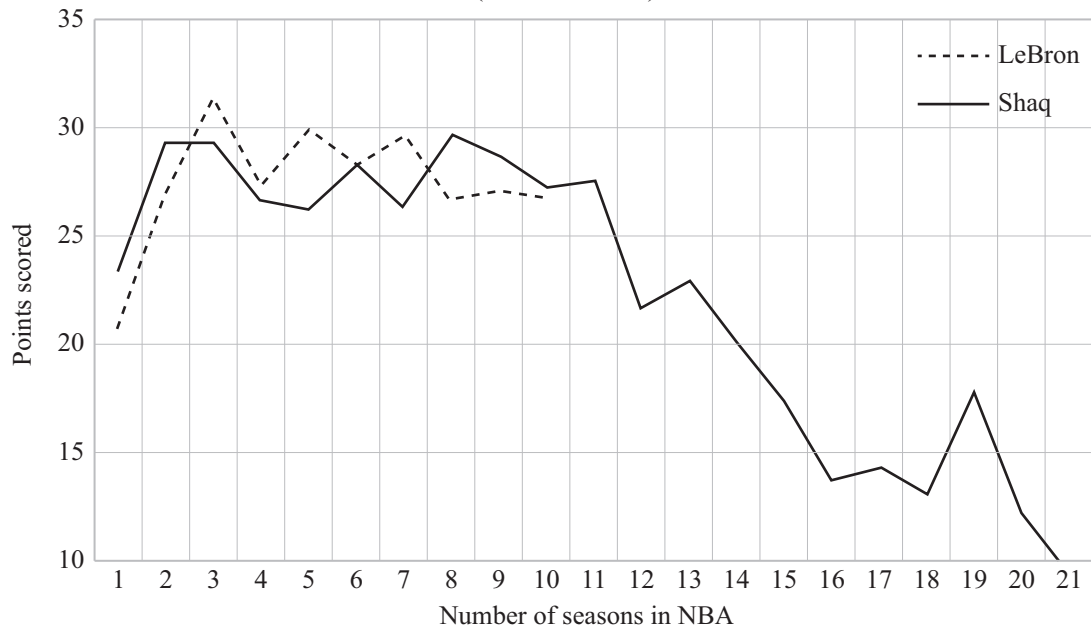




**Percentage of Shots Scored**  
(for each season)



**Mean Number of Points Scored**  
(for each season)



- (c) Considering both graphs together, looking at the first 10 seasons, what comment can you make about Shaq's shooting compared to LeBron's shooting?

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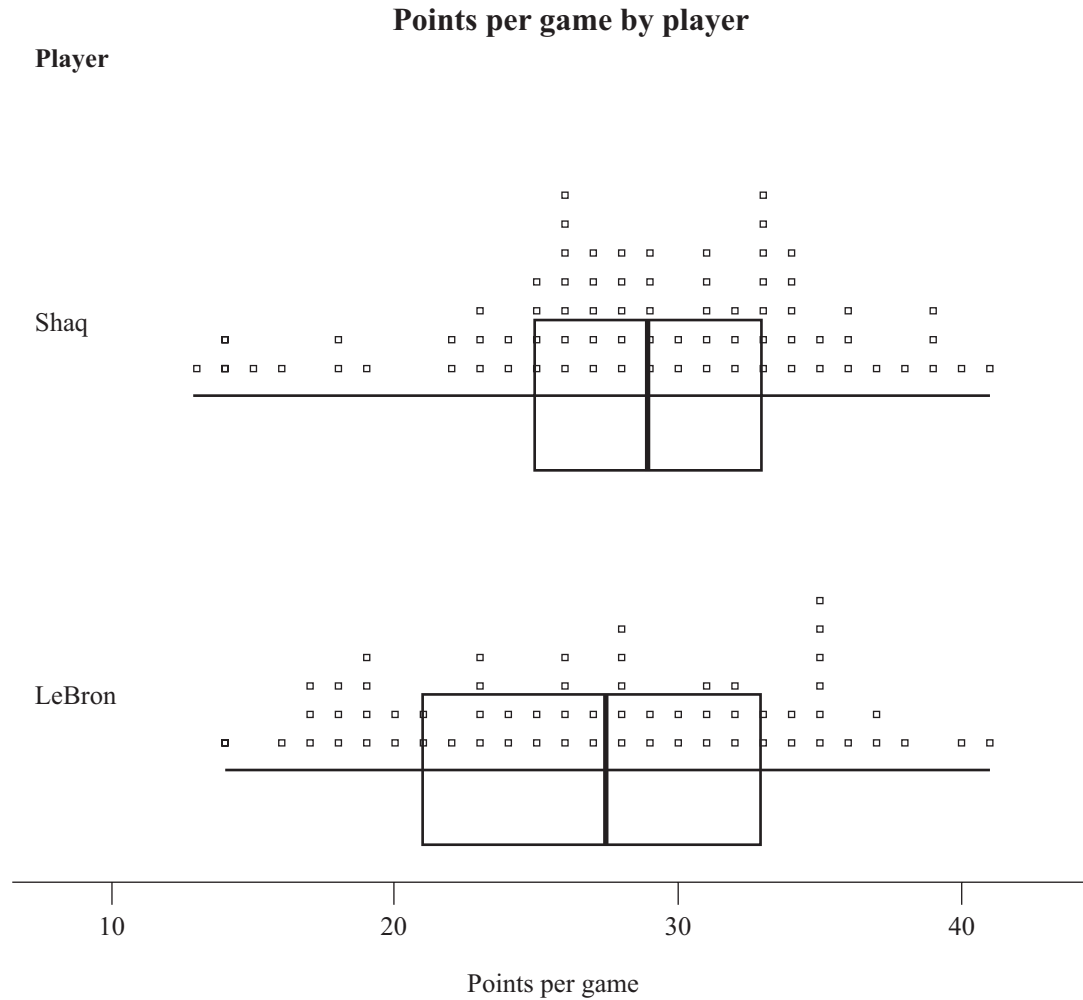


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**QUESTION THREE**

- (a) Levi next tries to compare the two players in more detail.  
He selects the season in which each player was 28 years old.  
He finds some statistics and draws a graph for the number of points each player scored in each game that season:



Player	Minimum	Lower Quartile	Median	Mean	Upper Quartile	Maximum	Sample Size
<b>Shaq</b>	13	25.25	29.0	28.72	33.00	41	74
<b>LeBron</b>	14	21.25	27.5	27.15	32.75	41	62

- (i) Which player has the higher mean number of points scored in each game, and by how much?

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- (ii) Levi notices that the mean and the median for Shaq are almost the same.

What does this tell you about the distribution of points scored in each game for Shaq?  
Support your answer by referring to the graphs given.

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- (iii) Can Levi use this data to conclude that one player scores more points than the other?

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- (b) At the school fair, a game offers three shots at a basketball hoop.

- It costs \$2 to enter.
- If you score on all 3 shots, you win \$10.
- Otherwise, you do not win anything.

Levi kept records of this game from this year's fair.

He recorded how many times each person scored on their three shots.

The graph for the results is on the next page.

- (i) From this data, what is the probability that a person wins \$10?

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- (ii) How much money did this game raise for the school this year?

Explain your reasoning, based on this graph.

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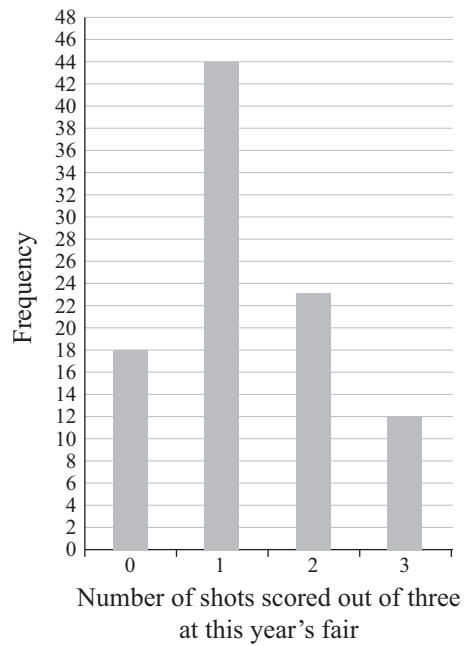


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**Number scored in three shots at this year's fair**




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- (iii) If you were organising this game for **next year's** fair, how helpful would these results be for you in predicting how much money the game would raise?

Explain your answer using statistical ideas.

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