Assessment Schedule – 2014

Mathematics and Statistics: Demonstrate understanding of chance and data (91037)

Evidence Statement

One	Expected coverage	Achievement	Merit	Excellence
(a)(i)	Probably no because, (eg): 1. It really depends on how good / how close / practiced / tall he is or the conditions (wind / opposition) – it may be more or less than 50% 2. For any shot it is easier to miss since that area is larger than the area to score, so the chances would be lower than 50%. 3. No: just because there are 2 outcomes does not mean that the probabilities are 50% (equally likely).	ONE valid probability idea.	TWO valid probability ideas with some justification.	TWO valid fully justified probability ideas.
(ii)	You would expect Levi's Dad to score about 120 shots, but there could be quite a lot of variation around that number.	Calculates 120 shots scored.	Qualifies the 120 by saying that it will not necessarily be exact.	
(b)(i)			Point plotted at 25% and joined into the graph.	
(ii)	States a value / range of values eg 60-70%, 13/20 but NOT 13/21 or 14/21 Confidence is supported / qualified by: 1. The overall trend of the graph. 2. The trend has remained fairly constant since the 8th shot. 3. He has only taken 20 shots which is a small number. 4 The experimental probability as at 20 shots, 0.65.	Probability / range of probabilities correct.	Probability supported by ONE valid statistical reason.	Probability supported by TWO valid statistical reasons.

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response; no relevant evidence.	Some relevant progress	1 of u	2 of u	3 of u	2 of r	3 of r	1 of t	2 of t

Two	Expected coverage	Achievement	Merit	Excellence
(a)	1. For their first ten seasons, LeBron always has a higher percentage than Shaq. 2. LeBron has scored more consistently than Shaq. This is shown by (eg): Shaq's accuracy varies from 42% to 62% (20%) and LeBron's accuracy varies from 70% to 78% (8%). 3. Both graphs have a similar shape or pattern over most of the first 10 seasons. This is shown by (eg): The accuracy drops for the first 4 seasons, rises then more or less settles. 4. Specific Comparisons (eg): Shaq's best season is season 11 while LeBron's best season is 6th, Shaq's worst season was15th and Lebron's was 4th, in season 9-10 Shaq increases and LeBron decreases.	ONE valid comparison.	TWO valid comparisons, with justification.	THREE valid comparisons, with justification.
(b)(i)	1. Both players' mean scores are similar for each season. 2. The trend for the mean number of points increases over time for both players 3. A specific comparison (eg): • Both players increased their average points per game over the first 3 or 4 seasons. • They stay fairly steady after season 4. • From season 4, when LeBron increases Shaq decreases or vice-versa. • Shaq had the higher mean score in more seasons than LeBron. • Over the first 7 years LeBron began by scoring fewer goals per game than Shaq, but overtook him in the 3rd season and stayed above for the next 5 seasons before dropping down again.	ONE valid point.	TWO valid points.	
(ii)	1. Yes: LeBron has followed a similar pattern to Shaq in the past and may continue to do so. 2. Yes: If LeBron continues to follow his own pattern of points scored. 3. No: LeBron might follow a similar path to Shaq but there are lots of other variables that might have caused the decline in goals scored (or he may not even play next year). 4. No: Ten seasons is insufficient data to make a prediction for the next 5 seasons. 5. No: Only one other player to compare with is insufficient data to make a prediction for the next 5 seasons.	Arrives at a decision with some justification.	Arrives at a NO decision, or questions reliability with justification.	

(c)	Since Shaq's accuracy is usually lower than LeBron's, but he scores the same number of points (first 10 seasons), therefore: • he must have had more attempts than LeBron, OR • he has scored more points per shot (ie 3 pointers).		Correct conclusion not clearly communicated.	Correct conclusion communicated clearly.

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Three	Expected coverage	Achievement	Merit	Excellence
(a)(i)	28.72 – 27.15 = 1.57 points per game, in favour of Shaq.	Correctly calculates difference and states in favour of Shaq		

(ii)	Mean and median almost the same implies that:
	• the distribution is symmetric about the means / medians
	• the mean has not been influenced by any extreme values. This is shown in the graph(s) by (eg):
	  • the median sits centrally in the box
	  • clusters of dots look similar on both sides of the mean / median.
			Comments on one of the implications.
			OR
			Refers to there being similar shape / clusters on BOTH sides of the mean/median.
				Comments on one of the implications.
				AND
				Refers to there being similar shape / clusters on BOTH sides of the mean/median.

(iii)	1. If you compare means / medians or quartiles / boxes, Shaq scores slightly higher OR There is some evidence that the box for Shaq is shifted to the right a little, showing he scores higher. 2. The location of the medians / means OR their difference being too small, is used to conclude that one player does NOT score more points (on average per game) than the other. 3. The median for Shaq is not located outside the box for LeBron, therefore you could not say that there was any significant difference between the two (or median difference less than 1/3 of overall visual spread). 4. Since he has chosen only 1 season for each player, the results should not be used to make a conclusion in general as that season may not have been representative.	Conclusion supported by point 1 OR 4.	Conclusion supported by point 2.	Conclusion supported by point 3 OR 1, 2 AND 4.
(b)(i)	12 over 97 or 0.1237 or 12/97 or 12% Accept 12:85 but NOT 12:97.	Correct equivalent probability.		
(ii)	Based on this data, they gave out $10 12 times, which is $120 paid out. However, they will have brought in $97 \times 2 = \$194$ so they raised $74.	Accept CAO Allow consistency with (b)(i).		

| (iii) | 1. The probability of winning is a variable that is likely to change from year to year. Ninety-seven trials is large enough (or not) to get a helpful probability for estimating profits.
2. The number of players next year is very uncertain because of weather, competing activities etc. This means the results we have here are of limited use for next year.
3. Both 1 and 3 above can be used to estimate future profit.
Eg:
Increased P(win)… less profit
More people play … more profit. | Makes a relevant comment with some justification. | Makes TWO relevant comments with some justification. | Makes TWO relevant comments with clear justification including variability and a link to the amount of money raised. |

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Cut Scores

	Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
Score range	0 – 8	9 – 12	13 – 18	19 – 24