Assessment Schedule – 2015

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

Evidence Statement

One	Expected coverage	Achievement	Merit	Excellence
(a)	1. Trend: There is an increasing trend. 2. Seasonal variation: Each year shows the same pattern of increase and decrease. 3. Unusual feature: There is a sharp increase/jump in the middle of the graph. 4. Supported trend: The number of people going to Australia for holidays increases by about 10 000 over the ten years shown. 5. Supported seasonal variation: The number of people going to Australia for holidays peaks in Q3 (or dips in Q1) each year. 6. Supported unusual feature: The number of people going to Australia for holidays rose sharply during 2004-5 and then remained elevated.	Makes 1 point.	Makes 3 points. OR Makes 4 or 5 or 6 and one other. Accept statistical observations that are supported by contextual evidence, but not speculation	Makes 4 points. OR: Makes TWO of 4, 5 and 6. Accept statistical observations that are supported by contextual evidence, but not speculation
(b)	All comments must be comparative. 1. Trend: both graphs show increasing trends. 2. Seasonal variation comment: For China, the shape of the yearly patterns have flat peaks and are not jagged like those for Australia. 3. Unusual feature: the overall look of the peaks/dips in China's graph is different from that for Australia. 4. Supported trend: Numbers going to China increase from approx. 2 000 to 8 000 whereas those going to Australia increase from approx. 20 000 to 27 000. (accept differences in relative increases: - a 300% increase for China and only 30% increase for Australia). 5. Supported seasonal variation: Chinese data peaks in Q1 (or Q4 and Q1), whereas Australian data peaks in only Q3. 6. Supported unusual feature: China's graph is initially flat, then a seasonal pattern became established by 2004-5, whereas Australia's seasonal pattern is always there. 7. Numbers going to Australia are greater than those going to China.	Makes 1 point.	Makes 3 points. OR Makes 4 or 5 or 6 and one other. Accept statistical observations that are supported by contextual evidence, but not speculation.	Makes 4 points. OR Makes TWO of 4, 5 and 6. Accept statistical observations that are supported by contextual evidence, but not speculation.
(c)(i)	71%	Correct probability.		
(c)(ii)	About 70%, with reference to information from previous year(s) (part (ci) or graph on page 2).		Valid estimate AND uncertainty, with reasoning. Consistent with Q3c(i).	

NØ	N1	N2	A3	A4	M5	M6		E7	E8
No response or no relevant evidence	One question attempted	1u	2u	3u	2r	3r	1t		2t

Two	Expected coverage	Achievement	Merit	Excellence
(a)	All comments must be comparative. 1. Horizontal comparison of peaks / bars. E.g. females' peak is at a lower score. 2. Vertical comparison of peaks / bars. E.g. Females' peak has a higher frequency. 3. Spread (range or IQR) e.g. The middle 50% of males' scores are more spread out. 4. Symmetry/Skew/Uniformity e.g. Males' scores are generally more symmetrical about their peak than are the females'.	Makes 1 point	Makes 2 points	
(b)	1. Compares locations of the medians: e.g. In this sample, males are better shown by their median, being higher than the females' median. 2. Compares the locations of the middle 50%'s: e.g. the box for males' is shifted to the right compared to the females' showing that males are better. 3. Uses relative positions of medians and middle 50%: e.g. In general, there is probably no difference between genders for this sort of memory test since here, the median of one set is not outside the other box (or similar).	Makes a valid comment about the medians.	Makes a valid comment about the middle 50%.	Makes a valid call about significance, using both the medians and the IQRs.
(c)	Not really: 1. The data comes from school children so it couldn't be representative of all males and females in general. 2. The test is a particular type of short-term memory test, done online under time pressure, which may not represent memory in real life very well.		Makes the equivalent of point 1: Non-representative sample of the real-life population implied in the claim.	Makes the equivalent of point 2: Non-representative measure of the real-life "memory" as implied in the claim.
(d)	1. He could select equal numbers of males and female from the results he has so far. 2. He could use percentages (or relative frequency or proportion) on the vertical scale.	Makes point 1.	Makes point 2.	

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response or no relevant evidence	One question attempted	1u	2u	3u	2r	3r	1t	2t

Three	Expected coverage	Achievement	Merit	Excellence
(a)	50 – 36 = 14 (must be evaluated)	Correct IQR.		
(b)	1. Disagree – it is not unfair if he is making comments using the **averages / quartiles / ranges** because these are not affected by there being different numbers in the 2 samples. 2. Agree – it is unfair if he is comparing the **bar graphs**, because the **heights** of the bars are affected by the sample sizes being different.		Makes the equivalent of point 1 OR point 2.	Makes the equivalent of point 1 AND point 2.
(c)(i)	$\dfrac{203}{487} = 0.4168$ (4sf) Accept 203:284 Accept 203 out of 487 Accept any rounding/truncation	Correct probability.		
(ii)	75%		Correct probability.	
(d)	1. Deduces that Brianna's test score must have been more than the mean otherwise it would not have risen. 2. Deduces that there must have been more than one original data value the same as the median, 42. 3. For the mean (correct to 2dp), to go up: $\dfrac{44.88 \times 284 + \text{Brianna's score}}{285} > 44.88$ Her score has to be a whole number, so it would need to be at least 47, to make the mean increase.		Makes the equivalent of point 1 OR point 2.	Makes the equivalent of point 1 AND point 2. OR Makes the equivalent of point 1 AND point 3.
(e)	There is really no relationship between the age of the student and the memory score. This is seen by the way that every age has almost the whole range of scores from 20 to 80. OR This is seen by the way that the dots do not follow any line.	Correct response but no justification.	Correct response with valid justification.	

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response or no relevant evidence	One question attempted	1u	2u	3u	2r	3r	1t	2t

Cut Scores

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