Commentary on candidate evidence

The evidence for the following candidate responses achieved the marks given below.

Candidate 1

Paper 1 Question 1(a)

The candidate was awarded **1/2 marks.**

- •[1] correct response **(1 mark)**
- •[2] insufficient response as no numerical comparisons were included **(0 marks)**

Candidate 2

Paper 1 Question 1(a)

The candidate was awarded **2/2 marks.**

- •[1] correct response **(1 mark)**
- •[2] correct response **1 mark)**. This is an example of clear communication, with both labels and citation of numerical values. It goes beyond the illustrative scheme by including comparison of the minimum with the lower fence.

Candidate 3

Paper 1 Question 1(c)

The candidate was awarded **1/6 marks.**

- •[5] incorrect response. Refer to Note 1 **(0 marks)**
- •[6] accepted response for the comment written at the very end of their solution **(1 mark)**
- •[7] incorrect response. Refer to Note 1. **(0 marks)**
- •[8] incorrect response. Refer to Note 1. **(0 marks)**
- •[9] incorrect response. Refer to Note 1. **(0 marks)**
- •[10] incorrect response. Refer to Note 1. **(0 marks)**

As an additional observation, the phrase used for the 2000s of the data being quite '*evenly spread*' is not ideal. A more appropriate phrase might have been 'more uniformly spread' as it is more in keeping with named distributions that are in the course content.

Candidate 4

Paper 1 Question 1(c)

The candidate was awarded **1/6 marks.**

- •[5] incorrect response. Refer to Note 1. **(0 marks)**
- •[6] incorrect response. Refer to Note 1. **(0 marks)**
- •[7] incorrect response. Refer to Note 1. **(0 marks)**
- •[8] incorrect response. Refer to Note 1. **(0 marks)**
- •[9] incorrect response. They did not clearly communicate a decreasing trend, but rather just compared 1980s sample sizes to both 1990s and 2000s. **(0 marks)**
- •[10] acceptable response of '*there were more songs in the top charts in the 1980s compared to the 1990s and 2000s*'. **(1 mark)**

Candidate 5

Paper 1 Question 1(c)

The candidate was awarded **6/6 marks.**

- •[5] correct response **(1 mark)**
- •[6] correct response **(1 mark)**
- •[7] correct response **(1 mark)**
- •[8] correct response **(1 mark)**
- •[9] correct response **(1 mark)**
- •[10] correct response **(1 mark)**

The inclusion of the final comment from the candidate about data being more uniformly distributed did not detract from their earlier, correct responses.

Candidate 6

Paper 1 Question 1(c)

The candidate was awarded **6/6 marks.**

- •[5] correct response **(1 mark)**
- •[6] correct response **(1 mark)**
- •[7] correct response **(1 mark)**
- •[8] correct response **(1 mark)**
- •[9] correct response **(1 mark)**
- •[10] correct response **(1 mark)**

This is an example of an excellent response that clearly followed the structure provided by the question for the three aspects to comment upon, along with their contextual meaning.

Candidate 7

Paper 1 Question 1(c)

The candidate was awarded **5/6 marks.**

- $\bullet^5$ correct response indicated by $\overline{x}_{80s} < \overline{x}_{90s} < \overline{x}_{00s}$ **(1 mark)**
- $\bullet^6$ correct response for the phrase '*songs are staying in the charts for longer as time progresses*' **(1 mark)**
- $\bullet^7$ correct response indicated by $s_{80s} < s_{90s} < s_{00s}$ **(1 mark)**
- $\bullet^8$ incorrect response due to the inclusion of the phrase '*This shows that the variance of length of time in the charts is decreasing and so the songs are more likely to be in it for longer*' which contradicts their response for mark $\bullet^7$ **(0 marks)**
- $\bullet^9$ correct response indicated by $n_{80s} > n_{90s} > n_{00s}$ **(1 mark)**
- $\bullet^{10}$ correct response for the phrase '*as this means there'll be less room for other songs*' **(1 mark)**

Candidate 8

Paper 1 Question 1(c)

The candidate was awarded **6/6 marks.**

- $\bullet^5$ correct response within the second paragraph **(1 mark)**
- $\bullet^6$ correct response within the second paragraph **(1 mark)**
- $\bullet^7$ correct response within the first paragraph **(1 mark)**
- $\bullet^8$ correct response within the first paragraph **(1 mark)**
- $\bullet^9$ correct response within the third paragraph **(1 mark)**
- $\bullet^{10}$ correct response within the third paragraph **(1 mark)**

Candidate 9

Paper 1 Question 1(d)(ii)

The candidate was awarded **1/1 marks.**

- $\bullet^{14}$ correct response **(1 mark)**

This is an example of a clearly understood concept that is communicated in a technically precise manner.

Candidate 10

Paper 1 Question 1(d)(ii)

The candidate was awarded **1/1 marks.**

- $\bullet^{14}$ correct response due to their inclusion of '*ie 95 out of 100 times*' **(1 mark)**

Candidate 11

Paper 1 Question 1(d)(ii)

The candidate was awarded **1/1 marks.**

- $\bullet^{14}$ correct response **(1 mark)**

This is an example of a well understood concept communicated in clear terms.

Candidate 12

Paper 1 Question 1(d)(ii)

The candidate was awarded **1/1 marks.**

- $\bullet^{14}$ correct response due to the second paragraph **(1 mark)**

Candidate 13

Paper 1 Question 1(d)(ii)

The candidate was awarded **0/1 marks.**

- $\bullet^{14}$ incorrect response. Refer to Note 3. **(0 marks)**

Candidate 14

Paper 1 Question 1(e)

The candidate was awarded **0/2 marks.**

- $\bullet^{15}$ incorrect response due to inclusion of 'Accept H_0' **(0 marks)**
- $\bullet^{16}$ incorrect response due to omission of **mean** 'number of weeks' **(0 marks)**

Candidate 15

Paper 1 Question 2(c)

The candidate was awarded **1/2 marks.**

- $\bullet^{4}$ correct response **(1 mark)**
- $\bullet^{5}$ unacceptable response because no reason is given for the effect that they described **(0 marks)**

Candidate 16

Paper 1 Question 2(c)

The candidate was awarded **1/2 marks.**

- $\bullet^{4}$ correct response **(1 mark)**

- $\bullet^5$ unacceptable response because it is unclear what 'the values' are that are being referred to **(0 marks)**

Candidate 17

Paper 1 Question 2(e)

The candidate was awarded **4/5 marks.**

- $\bullet^8$ missing response because no hypotheses were stated **(0 marks)**
- $\bullet^9$ correct response **(1 mark)**
- $\bullet^{10}$ correct response **(1 mark)**
- $\bullet^{11}$ correct response **(1 mark)**
- $\bullet^{12}$ correct response **(1 mark)**

Note that this candidate's handwriting means that the digits '5' and '9' are very hard to distinguish, most notably in the decimal values in the denominator of the calculation for the value of z.

Candidate 18

Paper 1 Question 2(e)

The candidate was awarded **4/5 marks.**

- $\bullet^8$ correct response **(1 mark)**
- $\bullet^9$ correct response **(1 mark)**
- $\bullet^{10}$ correct response **(1 mark)**
- $\bullet^{11}$ incorrect response because of inclusion of ± symbol. **(0 mark)**
- $\bullet^{12}$ correct response **(1 mark)**

Candidate 19

Paper 1 Question 2(e)

The candidate was awarded **3/5 marks.**

- $\bullet^8$ correct response **(1 mark)**
- $\bullet^9$ correct response, despite it being hard to read the decimal value **(1 mark)**.
- $\bullet^{10}$ correct response, but it is notable for the method chosen which can cause rounding errors. Where proportion fractions are available, the pooled proportion can be most quickly and accurately obtained by the method exemplified in the marking instructions. **(1 mark)**
- $\bullet^{11}$ no response **(0 marks)**
- $\bullet^{12}$ no response **(0 marks)**

Candidate 20

Paper 1 Question 2(e)

The candidate was awarded **3/5 marks.**

- •[8] correct response **(1 mark)**
- •[9] correct response **(1 mark)**
- •[10] incorrect response because value was not written with sufficient accuracy (see Note 1). **(0 marks)**
- •[11] correct calculation for z, despite the value of 0.3 leading to the value of actually being 2.047, and not 2.03 as they have stated (see Note 2). **(1 mark)**
- •[12] no response **(0 marks)**

Candidate 21

Paper 2 Question 1

The candidate was awarded **4/6 marks.**

- •[1] correct response **(1 mark)**
- •[2] correct response **(1 mark)**
- •[3] incorrect response due to incorrect observed frequency of 322 **(0 marks)**
- •[4] correct response **(1 mark)**
- •[5] correct response **(1 mark)**
- •[6] incorrect response because conclusion is too definite **(0 marks)**

Candidate 22

Paper 2 Question 2(c)

The candidate was awarded **0/2 marks.**

- •[3] incorrect response because there was no evidence of multiplying probabilities **(0 marks)**
- •[4] incorrect response because of the inclusion of $P(X=1.7)$ being inconsistent with the final answer and calculator syntax is not acceptable. Therefore, marks exemplified in Commonly Observed Response number 3 could not be awarded. **(0 marks)**

Candidate 23

Paper 2 Question 3

The candidate was awarded **4/4 marks.**

- •[1] correct response **(1 mark)**
- •[2] correct response **(1 mark)**
- •[3] acceptable method using $V(X)=E[(X-E(X))^2]$ **(1 mark)**
- •[4] correct response **(1 mark)**

Candidate 24

Paper 2 Question 5(b)

The candidate was awarded **8/8 marks.**

- $\bullet^2$ correct response **(1 mark)**
- $\bullet^3$ correct response **(1 mark)**
- $\bullet^4$ correct response **(1 mark)**
- $\bullet^5$ correct response **(1 mark)**
- $\bullet^6$ correct response **(1 mark)**
- $\bullet^7$ correct response **(1 mark)**
- $\bullet^8$ correct response **(1 mark)**
- $\bullet^9$ correct response **(1 mark)**

It was noted by the marking team that this would be considered a perfectly constructed response.

Candidate 25

Paper 2 Question 5(b)

The candidate was awarded **1/8 marks.**

- $\bullet^2$ not available, in line with Commonly Observed Responses (Candidate B) **(0 marks)**
- $\bullet^3$ incorrect response because population parameters were not used **(0 marks)**
- $\bullet^4$ incorrect response because s_F has incorrect value **(0 marks)**
- $\bullet^5$ not available, in line with Commonly Observed Responses (Candidate B) **(0 marks)**
- $\bullet^6$ correct response **(1 mark)**
- $\bullet^7$ insufficient response as there was no reference to the level of significant level used (either here or anywhere in their solution) **(0 marks)**
- $\bullet^8$ incorrect response **(0 marks).** There is no mention of the **mean** differences (see Note 7.)
- $\bullet^9$ incorrect response because no mention of context, nor differences (see Note 9). **(0 marks)**

Candidate 26

Paper 2 Question 7(a)

The candidate was awarded **0/2 marks.**

- $\bullet^1$ incorrect response because of Note 1. **(0 marks)**
- $\bullet^2$ incorrect response because of Note 1. **(0 marks)**

Candidate 27

Paper 2 Question 8(b)(i)

The candidate was awarded **1/1 marks.**

$\bullet^3$ correct response, even though the candidate has used a more complex method **(1 mark)**.

Candidate 28

Paper 2 Question 8(b)(ii)

The candidate was awarded **1/3 marks.**

For context, this candidate's response to question 8(b)(i) was incorrect. Therefore, their response to 8(b)(ii) involved accounting for carry-through errors from their perceived understanding of the situation.

- $\bullet^4$ incorrect strategy **(0 marks)**
- $\bullet^5$ consistent method of multiplying each fraction of $\frac{2}{5}$ and $\frac{3}{8}$ by the fraction $\frac{2}{5}$ **(1 mark)**
- $\bullet^6$ unacceptable response because it is unclear how the answer of '*15.5%*' was obtained from the incorrect earlier working. **(0 marks)**

Candidate 29

Paper 2 Question 8(b)(iii)

The candidate was awarded **3/3 marks.**

- $\bullet^4$ correct response implied from $\bullet^5$ (see Note 2.) **(1 mark)**
- $\bullet^5$ correct response **(1 mark)**
- $\bullet^6$ correct response **(1 mark)**

Candidate 30

Paper 2 Question 9(a)

The candidate was awarded **0/2 marks.**

- $\bullet^1$ incorrect response because of the use of just '*sample mean* and not 'distribution' of sample mean, and the last line does not include the notation cited in Note 2. **(0 marks)**
- $\bullet^2$ incorrect response as no explicit mention of population distribution **(0 marks)**

Candidate 31

Paper 2 Question 9(a)

The candidate was awarded **0/2 marks.**

- •[1] incorrect response because the last line does not include the notation cited in Note 2. **(0 marks)**
- •[2] incorrect response as no explicit mention of population distribution **(0 marks)**

Candidate 32

Paper 2 Question 9(a)

The candidate was awarded **2/2 marks.**

- •[1] correct response **(1 mark)**
- •[2] correct response **(1 mark)**

This is an example of an excellently understood and clearly communicated concept.

Candidate 33

Paper 2 Question 9(b)

The candidate was awarded **1/5 marks.**

- •[3] incorrect response because of the value of the denominator **(0 marks)**
- •[4] correct response **(1 mark)**
- •[5] incorrect response because they were comparing a z-value (1.64) with a cumulative probability (0.6026). In addition, 'reject H_1' is not acceptable. **(0 marks)**
- •[6] incorrect conclusion because they claim that the mean batten width is not less than 50mm, which is inconsistent with their null hypothesis **(0 marks)**
- •[7] incorrect response **(0 marks)**

Candidate 34

Paper 2 Question 9(b)

The candidate was awarded **1/5 marks.**

- •[3] accepted response even though the numerator terms are the wrong way round **(1 mark)**
- •[4] not awarded because they calculated a p-value and then compared it to 1.64 rather than 0.05 **(0 marks)**
- •[5] not acceptable response because they used 'accept H_0' **(0 marks)**
- •[6] incorrect response because of Note 2. **(0 marks)**
- •[7] incorrect response **(0 marks)**

Candidate 35

Paper 2 Question 9(b)

The candidate was awarded **2/5 marks.**

- $\bullet^3$ incorrect response because of the value of the denominator **(0 marks)**
- $\bullet^4$ correct response **(1 mark)**
- $\bullet^5$ accepted response because it is consistent with the calculated value of z **(1 mark)**
- $\bullet^6$ incorrect response because it has been phrased in terms of H_1 and not H_0 **(0 marks)**
- $\bullet^7$ incorrect response **(0 marks)**

Candidate 36

Paper 2 Question 10(a)

The candidate was awarded **4/7 marks.**

- $\bullet^1$ incorrect hypotheses, even though a second set of hypotheses were stated at the very end of their solution **(0 marks)**
- $\bullet^2$ accepted response. See Commonly Observed Response Candidate A **(1 mark)**
- $\bullet^3$ accepted response because $t = 3.08$ is a correct value from their calculation, even though their calculation involved rounded values **(1 mark)**
- $\bullet^4$ correct response **(1 mark)**
- $\bullet^5$ correct response **(1 mark)**
- $\bullet^6$ unacceptable response, please see Note 4. **(0 marks)**
- $\bullet^7$ incorrect response **(0 marks)**

Candidate 37

Paper 2 Question 11(a)(ii)

The candidate was awarded **3/4 marks.**

- $\bullet^3$ correct response **(1 mark)**
- $\bullet^4$ unacceptable response because of Note 6. **(0 marks)**
- $\bullet^5$ acceptable decision regarding H_0 because it was consistent with what the candidate considered to be a valid p-value, even though it was an incorrect p-value. **(1 mark)**
- $\bullet^6$ acceptable response because it was consistent with the decision made regarding H_0. **(1 mark)**

Candidate 38

Paper 2 Question 11(b)

The candidate was awarded **3/5 marks.**

- $\bullet^7$ accepted response because of Note 1. **(1 mark)**
- $\bullet^8$ incorrect response for E*(D)* which should have been -0.5 **(0 marks)**
- $\bullet^9$ incorrect response because it was inconsistent with $D = J - A$ **(0 marks)**
- $\bullet^{10}$ accepted response because it was consistent with previous calculation **(1 mark)**
- $\bullet^{11}$ accepted response because it was consistent with the previous calculation **(1 mark)**