

Commentary on candidate evidence

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

Question paper 2

Question 1(a)

Candidate 1 evidence

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

- ¹ Correct response. (1 mark)
- ² Correct response. See Note 2. (1 mark)

Question 1(b)

Candidate 2 evidence

The candidate was awarded **2/3 marks**.

- ³ Incorrect response. See Note 1. (0 marks)
- ⁴ Acceptable response. (1 mark)
- ⁵ Correct response. (1 mark)

Candidate 3 evidence

The candidate was awarded **2/3 marks**.

- ³ Incorrect response. See note 1. (0 marks)
- ⁴•⁵ Accepted response. The candidate's answer (0.07656) is not equal to the value in the illustrative scheme (0.0764), but it is the exact value obtained from using a graphic calculator to evaluate $P(\bar{X} > 111)$ (2 marks)

Other notable aspects of this response:

- ◆ The candidates' statement about the distribution of X suggests that a distribution is equal to a number (0.07656) is not correct.
- ◆ See Section 2 of the 2023 course report: 'Some candidates' responses incorrectly stated the need to use the Central Limit Theorem, or they checked that the sample size was greater than 20.'

Question 1(c)

Candidate 4 evidence

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

- ⁶ Correct response. The candidate's response was enhanced by the inclusion of a helpful diagram. **(1 mark)**

Candidate 5 evidence

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

- ⁶ Insufficient response. As a whole, the candidate's response is inconsistent. This is because whilst the first sentence could be considered to be correct, the second sentence is not correct. In addition, the reference to '...it will have a height...' is unclear as to what is being referred to by 'it'. **(0 marks)**

Candidate 6 evidence

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

- ⁶ Incorrect response. See Note 1. **(0 marks)**

Question 2

Candidate 7 evidence

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

- ¹ Incorrect response. See Note 1. **(0 marks)**
- ² No response. **(0 marks)**
- ³ Correct response. **(1 mark)**
- ⁴ Correct response. **(1 mark)**
- ⁵ Correct response. **(1 mark)**
- ⁶ Correct response. **(1 mark)**

Question 3(a)

Candidate 8 evidence

The candidate was awarded **0/3 marks**.

- ¹ Incorrect response. No distribution is mentioned. **(0 marks)**
- ² Incorrect response. No valid strategy is clear. **(0 marks)**
- ³ Incorrect response. **(0 marks)**

In addition, this response involves unacceptable calculator syntax being included in the main lines of working, rather than to the side.

Candidate 9 evidence

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

- ¹ Correct response. **(1 mark)**
- ² Incorrect response. There is no evidence of the strategy used, that does not include calculator syntax. **(0 marks)**
- ³ Incorrect response. **(0 marks)**

Question 3(b)

Candidate 10 evidence

The candidate was awarded **3/6 marks**.

- ⁴ Correct response, by implication (see Note 2). **(1 mark)**
- ⁵ Incorrect response. The candidate does not evaluate nq (see Notes 3 and 4) **(0 marks)**
- ⁶ Correct response **(1 mark)**
- ⁷ Incorrect response. The candidate's response does not use continuity correction. **(0 marks)**
- ⁸ Consistent response. **(1 mark)**
- ⁹ Inconsistent response. 0.9115 does not follow on from the previous line of working. Due to incorrect rounding, the candidate used a z value of 1.35 and not 1.36. **(0 marks)**

Candidate 11 evidence

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

- ⁴ Correct response. **(1 mark)**
- ⁵ Insufficient response. See Note 3. **(0 marks)**
- ⁶ Correct response. **(1 mark)**
- ⁷ Acceptable response. Even though the distribution of a proportion is being used, rather than Y 's distribution, there is evidence of valid continuity correction. **(1 mark)**
- ⁸ Correct response. **(1 mark)**
- ⁹ Correct response. **(1 mark)**

Question 5(a)(ii)

Candidate 12 evidence

The candidate was awarded **1/4 marks**.

- ³ Incorrect response. The value of p is not 0.125 **(0 marks)**
- ⁴ Unacceptable response. **(0 marks)**
- ⁵ Incorrect response. The candidate used $4p$ and not $5p$ in their evaluation of $E(X^2)$. **(0 marks)**
- ⁶ Consistent response. The candidate used their incorrect values in their incorrect formula. By coincidence, it delivered the correct value. **(1 mark)**

Question 6

Candidate 13 evidence

The candidate was awarded **2/6 marks**.

- ¹ Incorrect response. The candidate did not use a population parameter **(0 marks)**
- ² Correct response. **(1 mark)**
- ³ Missing response. **(0 marks)**
- ⁴ Inconsistent response. Even though 2.33 is included in the candidate's response, it is not the value that would be used for a 99% confidence interval. **(0 marks)**
- ⁵ Consistent response. The candidate has checked whether the confidence interval contained the desired value. **(1 mark)**
- ⁶ Unacceptable response. See Note 5. **(0 marks)**

Candidate 14 evidence

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

- ¹ Unacceptable response. See Commonly Observed Response 1. **(0 marks)**
- ² Correct response. **(1 mark)**
- ³ Correct response. **(1 mark)**
- ⁴ Acceptable response. See Note 4. **(1 mark)**
- ⁵ Correct response. **(1 mark)**
- ⁶ Correct response. **(1 mark)**

Question 7(a)

Candidate 15 evidence

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

- ¹ Missing response. **(0 marks)**
- ² Incorrect response. The candidate's response uses an incorrect tree diagram structure, as well as assuming some probabilities are 0.5 and 0.5. **(0 marks)**

Question 7(b)

Candidate 16 evidence

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

All elements of this candidate's solution are valid, despite it not matching the expected approach that was outlined in the illustrative scheme.

Candidate 17 evidence

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

- ³ Correct strategy, by implication from mark •⁴. **(1 mark)**
- ⁴ Correct response, recorded on the tree diagram. **(1 mark)**
- ⁵ Correct response, recorded on the tree diagram. **(1 mark)**
- ⁶ No evidence of correct strategy being used. **(0 marks)**
- ⁷ Unacceptable response. The candidate has presented the final value as equaling $P(J|A)$, not $P(J \cap A)$. **(0 marks)**

Question 9(a)

Candidate 18 evidence

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

- ¹ Response inconsistent with a non-parametric test. **(0 marks)**
- ² Missing response. **(0 marks)**
- ³ Incorrect response. **(0 marks)**
- ⁴ Unacceptable response. **(0 marks)**
- ⁵ Accepted response. The candidate has made a decision regarding H_0 that is consistent with what they consider to be the test statistic and critical value **(1 mark)**
- ⁶ Unacceptable response. The conclusion does not mention 'mean difference' **(0 marks)**

This candidate's response started off as a non-parametric test, and then became a z -test. So, whilst mark •¹ had the potential to be awarded for a z -test, the solution was judged as having made two attempts, and thus the lowest overall mark was awarded. This gave **1/6** rather than **2/6**.

Candidate 19 evidence

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

- ¹ Incorrect response. See Note 1. **(0 marks)**
- ² Correct response. **(1 mark)**
- ³ Correct response. **(1 mark)**
- ⁴ Correct response. **(1 mark)**
- ⁵ Correct response. **(1 mark)**
- ⁶ Incorrect response. See Note 6. **(0 marks)**

Question 9(b)(i)

Candidate 20 evidence

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

- ⁷ Acceptable response. This is despite the candidate referring to positive skew. **(1 mark)**

Question 9(b)(ii)

Candidate 21 evidence

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

- ⁸ Correct response. **(1 mark)**
- ⁹ Correct response. The candidate made effective use of the word 'dubious' **(1 mark)**

Question 10

Candidate 22 evidence

The candidate was awarded **3/6 marks**.

Refer to Commonly Observed Response – Candidate A.

- ¹ Acceptable response. **(1 mark)**
- ² Not available. **(0 marks)**
- ³ Not available. **(0 marks)**
- ⁴ Acceptable response. Note that 2.81 rather than -2.81 was included in the solution. The benefit of doubt was given regarding the cause of the wrong sign. The low level of legibility was a notable feature of this response. **(1 mark)**
- ⁵ Consistent decision regarding H_0 based upon what the candidate believed to be the test statistic and critical value. **(1 mark)**
- ⁶ Unacceptable response. The candidate made no mention of proportions. **(0 marks)**

Question 11

Candidate 23 evidence

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

- ¹ Correct response. **(1 mark)**
- ² Correct response. **(1 mark)**
- ³ Correct response. See Note 2. **(1 mark)**
- ⁴ Acceptable response. This was after rounding was taken into consideration. **(1 mark)**

Question 12(a)

Candidate 24 evidence

The candidate was awarded **2/4 marks**.

- ¹ Incorrect strategy. The candidate used a t_{n-1} distribution. **(0 marks)**
- ² Consistent substitution, approximating $t_{99,0.995}$ with $z_{0.995}$. **(1 mark)**
- ³ Response consistent with evaluating their stated expression. **(1 mark)**
- ⁴ Incorrect response. **(0 marks)**

For mark ●², Commonly Observed Response 1 does not apply, as this candidate's response has not mixed up proportions (0.55) with percentages (55). Their solution is consistent in terms of percentages.

Candidate 25 evidence

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

- ¹ Insufficient response. The 'bubble' used to represent the critical value multiplier is not sufficient for confirming whether t_{n-1} or z distributions are being used. **(0 marks)**
- ² Acceptable response. **(1 mark)**
- ³ Correct response. **(1 mark)**
- ⁴ Acceptable response. **(1 mark)**

Question 12(b)

Candidate 26 evidence

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

- ⁵ Acceptable strategy, demonstrated by the trial-and-improvement. **(1 mark)**
- ⁶ Correct substitutions. **(1 mark)**
- ⁷ Correct response. **(1 mark)**

Candidate 27 evidence

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

- ⁵ Incorrect response. See Note 3. **(0 marks)**
- ⁶ Consistent substitution. **(1 mark)**
- ⁷ Unacceptable response. The candidate's final two lines of working are inconsistent, and they stated an upper bound on the sample size. **(0 marks)**