

4

(a)

[3]

[illegible]

(b)

[1]

[illegible]

3

- (a)

- (b)

Explain why it is valid to use the Central Limit theorem in this case.

[1]

.....

.....

.....

- (c)

Find the largest value of r such that the probability that all r confidence intervals contain the true value of μ is greater than 0.5. [4]

[4]

This image shows a blank sheet of primary-ruled paper. It features ten sets of horizontal dashed lines spaced evenly down the page. At the bottom center, there is a small circle containing the number '2'. The rest of the page is white and contains no other markings or text.

- 2** The random variable X has the distribution $B\left(8, \frac{2}{4}\right)$. A random sample of 100 values of X is chosen, and the sample mean, $\bar{X}$, is found.

- (a) Find $P(\bar{X} > 6.2)$. You are **not** expected to use a continuity correction. [6]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

- (b)** State why the Central Limit Theorem was needed in the calculation in part **(a)**. [1]

[illegible]

3 The time, T minutes, for a certain daily bus journey is normally distributed. The bus company claims that the mean of T is 45. A passenger believes that the mean of T is actually greater than 45. She notes the times taken for this journey on a random sample of 60 days. The results are summarised below.

$n = 60$

$\sum t = 2750$

$\sum t^2 = 127\,000$

(a) Calculate unbiased estimates of the population mean and variance.

[3]

(b) Test the passenger’s belief at the 5% significance level.

[5]

- 6

- (a)

[1]

[illegible]

- (b)

[3]

Handwriting practice lines (dotted lines on a solid background) for the letter 'y'.

At Florence's college, in a random sample of 40 students, it was found that 5 own a Pumpkin phone.

- (c) Calculate an approximate 95% confidence interval for the proportion of students at Florence's college who own a Pumpkin phone. [3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.