

- (a) Find α . [3]

[illegible]

- [1]

[illegible]

- (a) Given that the end points of the 95% confidence interval are 31.02 and 33.98, correct to 4 significant figures, calculate the value of σ . [3]

[illegible]

- Explain why it is valid to use the Central Limit theorem in this case. [1]

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- [4]

②

- 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]

[illegible]

- (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.

$$n = 60 \qquad \Sigma t = 2750 \qquad \Sigma t^2 = 127000$$

- (a) Calculate unbiased estimates of the population mean and variance. [3]

[illegible]

- (b) Test the passenger's belief at the 5% significance level. [5]

[illegible]

- (a) State suitable hypotheses for the test.

[1]

- [3]

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