

Hypothesis Tests and confidence intervals – 2021/20 GCE Statistics Further Math A Y542**1. Nov/2021/Paper_Y542/01/No.4**

A random sample of 160 observations of a random variable X is selected. The sample can be summarised as follows.

$$n = 160 \quad \sum x = 2688 \quad \sum x^2 = 48\,398$$

(a) Calculate unbiased estimates of the following.

(i) $E(X)$ [1]

(ii) $\text{Var}(X)$ [3]

(b) Find a 99% confidence interval for $E(X)$, giving the end-points of the interval correct to 4 significant figures. [3]

(c) Explain whether it was necessary to use the Central Limit Theorem in answering

(i) part (a), [1]

(ii) part (b). [1]

2. Nov/2020/Paper_Y542/01/No.1

The continuous random variable X has the distribution $N(\mu, 30)$. The mean of a random sample of 8 observations of X is 53.1.

Determine a 95% confidence interval for μ . You should give the end points of the interval correct to 4 significant figures. [4]