Sampling and estimation—2023 Nov CIE Mathematics

1. Nov/2023/Paper_9709/61/No.1

A random variable X has the distribution $N(410, 400)$.	
Find the probability that the mean of a random sample of 36 values of X is less than 405. [3]	
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Nov/2023/Paper_9709/61/No.2
In a survey of 300 randomly chosen adults in Rickton, 134 said that they exercised regularly. This information was used to calculate an $\alpha\%$ confidence interval for the proportion of adults in Rickton who exercise regularly. The upper bound of the confidence interval was found to be 0.487, correct to 3 significant figures.
Find the value of α correct to the nearest integer. [4]
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2.

devi	iation 8.3.
(a)	The total length of a random sample of 85 lectures was 4590 minutes.
	Calculate a 95% confidence interval for $\mu$ . [3]
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The	length, in minutes, of history lectures at the college has mean $m$ and standard deviation $s$ .
<b>(b)</b>	Using a random sample of 100 history lectures, a $95\%$ confidence interval for $m$ was found to have width $2.8$ minutes.
	Find the value of $s$ . [2]

The length, in minutes, of mathematics lectures at a certain college has mean  $\mu$  and standard

**3.** Nov/2023/Paper_9709/62/No.2