

Extra Questions – Mean and Standard Deviation of Sample Means

Use: $\mu_{\bar{x}} = \mu$ and $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

- 5 WE14** Every year 500 students apply for a place at Maccas University. The average enrolment test score is 600 with a standard deviation of $\sqrt{300}$.
- a** Samples of 10 students are selected and the means found. Find the mean and standard deviation of the distribution of $\bar{x}$.
 - b** What effect would increasing the sample size to 20 have on the mean and standard deviation of the distribution of sample means?
- 6** A total of 1000 students are studying a statistics course at Minitrees University. On a recent exam, the mean score was 90.5 with a standard deviation of 10.
- a** Samples of 15 students are selected and the mean scores found. Find the mean and standard deviation of the distribution of $\bar{x}$.
 - b** What effect would increasing the sample size to 30 have on the mean and standard deviation of the distribution of sample means?

Questions **15** and **16** refer to a population with a mean of 67 and a standard deviation of 15.

- 15** If samples of size 20 are selected, find the mean and standard deviation of the distribution of sample means.
- 16** What sample size would be needed to reduce the standard deviation of the distribution of sample means to less than 2?

Answers:

- 5 a** $\mu_{\bar{x}} = 600, \sigma_{\bar{x}} = 5.48$
b $\mu_{\bar{x}} = 600, \sigma_{\bar{x}} = 3.87$
6 a $\mu_{\bar{x}} = 90.5, \sigma_{\bar{x}} = 2.58$
b $\mu_{\bar{x}} = 90.5, \sigma_{\bar{x}} = 1.83$
15 $\mu_{\bar{x}} = 67, \sigma_{\bar{x}} = 3.35$
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