

Confidence interval to be halved, does what to the sample size?

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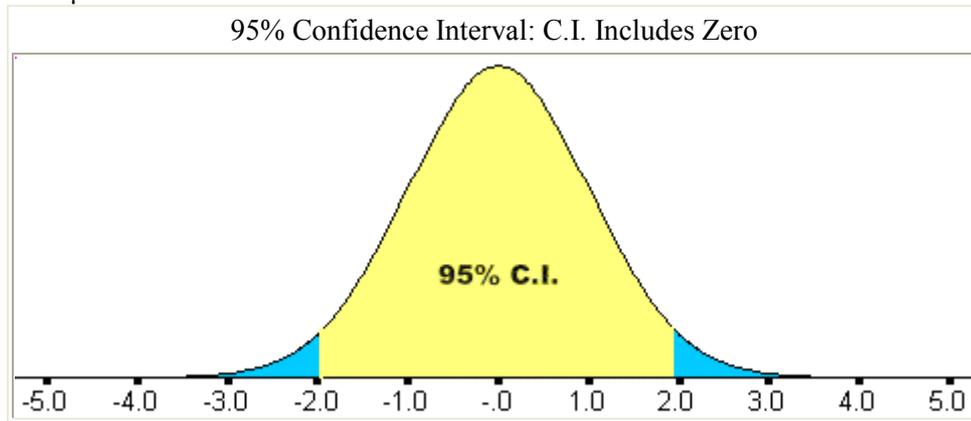
Select STAT icon (or press 2) from the main menu or by using the arrow keys to highlight and then press EXE.



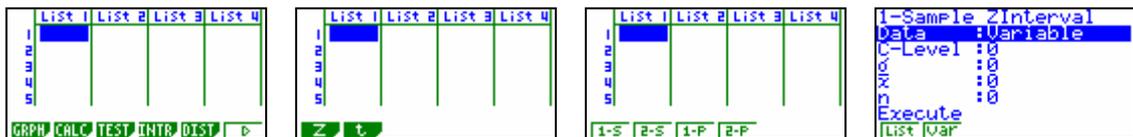
This worksheet shows how you can use the graphical calculator to calculate the sample size dependent on the confidence interval (C.I.) size required. The confidence interval gives an estimated range of values which is likely to include an unknown population parameter, the estimated range being calculated from a given set of sample data.

$$\mu - k \sigma / \sqrt{n} \leq \mu \leq \mu + k \sigma / \sqrt{n}, \text{ where } k \text{ is the z-score for C.I. calculations}$$

The width of the confidence interval gives us some idea about how uncertain (and certain) we are about the unknown parameter, μ . A very wide interval may indicate that more data should be collected before anything very definite can be said about the parameter. As most distributions are normally distributed, we can apply the standardised normal distribution curve with $\mu = 0$ and $\sigma = 1$.

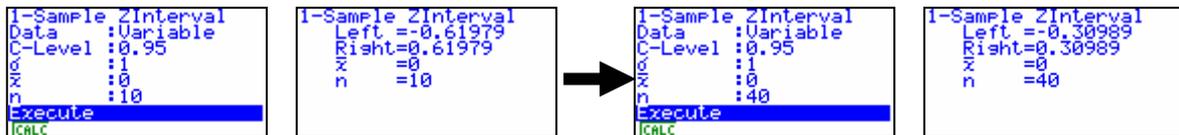


Menu trail for Confidence intervals:



F5 F1 then either F1 F2 F3 F4 depending on the problem, i.e. 1 statistics, 2 statistic, 1 proportion or 2 proportion.

Example: (i) Using $\mu = 0$ and $\sigma = 1$ and 95% C.I. level initially and $n=10$, then change n to $n=40$ and observe the effect on the confidence interval width.



(ii) Using $\mu = 0$ and $\sigma = 6$ initially and $n=100$, then change n to $n=400$ and observe the effect on the confidence interval width.



Interpretation: By multiplying the original sample size by 4 ($=2^2$) the confidence interval is halved.

Extension activity: By multiplying the original sample size by 9 ($=3^2$) will the confidence interval be $\frac{1}{3}$ the original? Generalise the result.