A study is conducted to estimate the mean height of a population. A random sample of 100 individuals is selected, and their heights are measured. Calculate a 95%confidence interval for the population mean height, given that the sample mean height is 170 cm and the sample standard deviation is 8 cm. Data: Sample size(n) =100, Sample mean (x̄) = 170 cm, Sample standard deviation (s) = 8 cm, Confidence level = 95%

Explanation: In this problem, we use a sample to estimate the population mean height. By calculating a confidence interval, we provide a range of plausible values for the population mean. The 95% confidence level indicates that weare95% confident that the true population mean height falls within the calculated interval.

| **Quantity** | **Symbol** | **Value** |
| --- | --- | --- |
| Sample size | n | 100 |
| Sample mean |  | 170 cm |
| Sample standard deviation | s | 8 cm |
| Desired confidence level | 1 − α | 95 % → α = 0.05 |

**the elements:**

**the appropriate critical value**

Because the sample size is large (n=100), the sampling distribution of the sample mean is approximately normal.

For a 95 % confidence interval the critical value is the 97.5th percentile of the standard normal distribution:

**Compute the standard error of the mean (SEM)**

**Margin of error (ME)**

**Form the confidence interval**

**Result**