



ASQ CRE Prep course

Lesson II. B. 2. a.

Statistical Interval Estimates

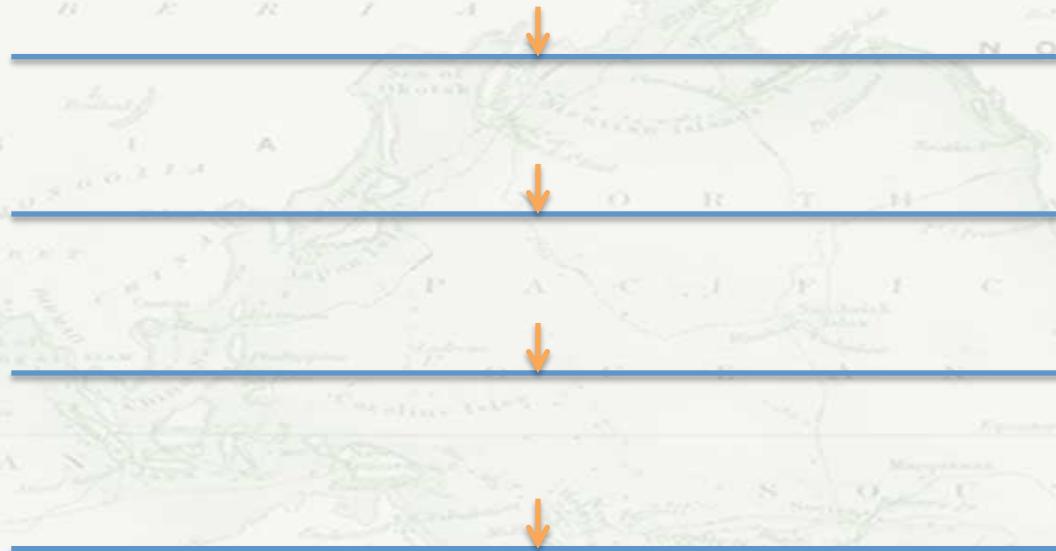
About Point Estimates

A photograph of a natural rock archway on a tropical beach. The archway is made of light-colored rock and is covered in green vegetation. The beach is sandy and leads into clear, turquoise water. The sky is a deep, clear blue.

Where might be the actual population value?

CONFIDENCE INTERVALS FOR POINT ESTIMATES

Confidence Interval Concept



Mean

Continuous Data Large Sample

- With 200 samples
- Sample mean is 23 &
- Population standard deviation is 4.5
- What is 95% confidence interval about the mean?

$$\bar{X} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

Mean

Continuous Data Small Sample

- With 20 samples
- Sample mean is 23 &
- Sample standard deviation is 4.5
- What is 95% confidence interval about the mean?

$$\bar{X} \pm t_{\alpha/2, (n-1)} \frac{\sigma}{\sqrt{n}}$$

Variance

- Sample of 25 systems
- Variance is 47
- What is 90% confidence interval about variance?

$$\frac{(n-1)s^2}{\chi^2_{\frac{\alpha}{2}, (n-1)}} \leq s^2 \leq \frac{(n-1)s^2}{\chi^2_{1-\frac{\alpha}{2}, (n-1)}}$$

Proportion

- (if np and $1-np \geq 5$ we can use normal)
- 23 Defective bolts in lot of 150
- What is 90% confidence interval for defect rate (proportion)?

$$p \pm Z_{\frac{\alpha}{2}} \sqrt{\frac{p(1-p)}{n}}$$

What is chance
the sample is
misleading?



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