ASQ CRE Prep course

Lesson II. B. 3. b.

Hypothesis Testing

For Means

Let's make some comparisons

HYPOTHESIS TEST FOR MEANS

Z Test

- **Pop Std Dev Known**

- **Compare pop mean with fixed value**

$H_o : \mu = \mu_o$

$H_a : \mu \neq \mu_o$

$H_o : \mu \leq \mu_o$

$H_a : \mu > \mu_o$

$H_o : \mu \geq \mu_o$

$H_a : \mu < \mu_o$

$$Z = \frac{\bar{X} - \mu_o}{\sigma_{\bar{X}}} = \frac{\bar{X} - \mu_o}{\sigma_X / \sqrt{n}}$$

Example

- **Existing process has mean of 7.8 mm and std dev of 0.16 mm plate thickness**

- **Did change in process result in thinner plates with 95% confidence?**

- **7.90, 7.70, 7.72, 7.67, 7.89, 7.69, 7.75, 7.68**

$$Z = \frac{\bar{X} - \mu_o}{\sigma_X / \sqrt{n}}$$

t-Test

- **Pop Std Dev unKnown**

- **Small sample size**

- **Compare pop mean with fixed value**

$$H_o : \mu = \mu_o$$

$$H_a : \mu \neq \mu_o$$

$$H_o : \mu \leq \mu_o$$

$$H_a : \mu > \mu_o$$

$$H_o : \mu \geq \mu_o$$

$$H_a : \mu < \mu_o$$

$$t = \frac{\bar{X} - \mu_o}{s_{\bar{X}}} = \frac{\bar{X} - \mu_o}{s_X / \sqrt{n}}$$

Example

- **The process spec is a minimum mean of 7.8 mm plate thickness**

- **Does new process create a too thin plate thickness mean with 95% confidence?**

- **7.90, 7.70, 7.72, 7.67, 7.89, 7.69, 7.75, 7.68**

$$t = \frac{\bar{X} - \mu_o}{s_{\bar{X}}} = \frac{\bar{X} - \mu_o}{s_X / \sqrt{n}}$$

What is the role
with Reliability?

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Lesson II. B. 3. c.

Hypothesis Testing

For Variance