| Normal Distns | | Sampling Distribution of the Sample Proportion | | |
|---|---|---|---|---|
| | $z = \frac{y-\mu}{\sigma}$<br>$y = z\sigma + \mu$ | | $\mu_{\hat{p}} = p$<br>$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$<br>np $\geq$ 10 and n(1 – p) $\geq$ 10 | $z = \frac{\hat{p}-p}{\sqrt{\frac{p(1-p)}{n}}}$ |

**Type of Inference**

| | | Assumptions | Confidence Interval | Hypothesis Test |
|---|---|---|---|---|
| ONE SAMPLE | Proportion | – random sample of *categorical* data<br>– np $\geq$ 10 and n(1 – p) $\geq$ 10<br>(for an interval, replace $p$ with $\hat{p}$) | $\hat{p} \pm z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$<br>sample size: $n = \left(\frac{z}{\text{MOE}}\right)^2 \hat{p}(1-\hat{p})$ | $z = \frac{\hat{p}-p}{\sqrt{\frac{p(1-p)}{n}}}$ |

| Chi-Square Test | |
|---|---|
| | $\text{exp} = \frac{\text{column total}}{\text{grand total}} * \text{row total}$<br>$X^2 = \sum_{\text{all cells}} \frac{(\text{obs}-\text{exp})^2}{\text{exp}}$ |

| Level of Confidence | 90% | 95% | 96% | 98% | 99% |
|---|---|---|---|---|---|
| **Critical z value** | 1.645 | 1.96 | 2.054 | 2.326 | 2.576 |

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| Sampling Distribution of the Sample Mean | | |
|---|---|---|
| | $\mu_{\bar{y}} = \mu$<br>$\sigma_{\bar{y}} = \frac{\sigma}{\sqrt{n}}$ | $z = \frac{\bar{y}-\mu}{\frac{\sigma}{\sqrt{n}}}$ |

**Type of Inference**

| | | Assumptions | Confidence Interval | Hypothesis Test |
|---|---|---|---|---|
| ONE SAMPLE | Mean | – random sample of *quantitative* data<br>– variable is normally distributed (or n $\geq$ 100) | $\bar{y} \pm t\left(\frac{s}{\sqrt{n}}\right),\ df = n-1$ | $t = \frac{\bar{y}-\mu}{\frac{s}{\sqrt{n}}},\ df = n-1$ |
| TWO SAMPLE MEAN | Dependent Samples | – random, dependent sample of *quantitative* data<br>– differences are normally distributed (or $n_d \geq 100$) | $\bar{y}_d \pm t\left(\frac{s_d}{\sqrt{n_d}}\right),\ df = n_d - 1$ | $t = \frac{\bar{y}_d - \mu_d}{\frac{s_d}{\sqrt{n_d}}},\ df = n_d - 1$ |
| | Independent Samples | – random, independent samples of *quantitative* data<br>– variable is normally distributed for both populations (or $n_1 \geq 100$ AND $n_2 \geq 100$) | $(\bar{y}_1 - \bar{y}_2) \pm t\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$<br>(df will be given in output) | $t = \frac{(\bar{y}_1 - \bar{y}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$<br>(df will be given in output) |

| ANOVA | |
|---|---|
| | $f = \frac{\text{MST}}{\text{MSE}}$ |

| Regression | | |
|---|---|---|
| | $y = mx + b$ | $t = \frac{\text{slope estimate} - 0}{\text{std. error}}$ |