### EQUATIONS

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{x} = \frac{1}{n} \sum x_i$</td>
<td>Sample mean</td>
</tr>
<tr>
<td>$s^2 = \frac{1}{n-1} \left[ \sum x_i^2 - \frac{1}{n} \left( \sum x_i \right)^2 \right]$</td>
<td>Sample variance</td>
</tr>
<tr>
<td>$x_p = \mu + \sigma_x z_p$</td>
<td>Sampling distribution</td>
</tr>
<tr>
<td>$P(</td>
<td>X - \mu</td>
</tr>
<tr>
<td>$\sigma_x^2 = \frac{\sigma^2}{n}$</td>
<td>Variance of population</td>
</tr>
<tr>
<td>$\sigma_p^2 = \frac{p(1-p)}{n}$</td>
<td>Variance of sampling distribution</td>
</tr>
<tr>
<td>$n = \frac{z_{1-\alpha/2}^2 p(1-p)}{m^2}$</td>
<td>Sample size</td>
</tr>
<tr>
<td>$\bar{x} \pm t_{1-\alpha/2} \frac{s}{\sqrt{n}}$</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$</td>
<td>t-test</td>
</tr>
<tr>
<td>$\sigma_{\bar{x_1}, \bar{x_2}}^2 = \frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}$</td>
<td>Variance of two sample means</td>
</tr>
<tr>
<td>$\bar{x}_1 - \bar{x}<em>2 \pm t</em>{1-\alpha/2} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$</td>
<td>Confidence interval for two means</td>
</tr>
<tr>
<td>$df = \frac{(V_1 + V_2)^2}{V_1^2/n_1 - 1 + V_2^2/n_2 - 1}$</td>
<td>Degrees of freedom</td>
</tr>
<tr>
<td>$V_1 = \frac{s_1^2}{n_1}$</td>
<td></td>
</tr>
<tr>
<td>$V_2 = \frac{s_2^2}{n_2}$</td>
<td></td>
</tr>
<tr>
<td>$z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$</td>
<td>z-test</td>
</tr>
<tr>
<td>$p_c = n_1 \hat{p}_1 + n_2 \hat{p}_2 / n_1 + n_2$</td>
<td>Confidence interval for two proportions</td>
</tr>
<tr>
<td>$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_p^2 \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$</td>
<td>t-test</td>
</tr>
<tr>
<td>$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$</td>
<td>Confidence interval for two proportions</td>
</tr>
<tr>
<td>$\bar{x}_1 - \bar{x}<em>2 \pm t</em>{1-\alpha/2} \sqrt{s_p^2 \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}$</td>
<td>Confidence interval for two means</td>
</tr>
<tr>
<td>$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}}$</td>
<td>t-test</td>
</tr>
<tr>
<td>$\mu_B = \frac{n \bar{x} + n \bar{y}}{\frac{n}{\sigma_x^2} + \frac{n}{\sigma_y^2}}$</td>
<td>Mean of two samples</td>
</tr>
<tr>
<td>$\frac{n}{\sigma_x^2} + \frac{n}{\sigma_y^2}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{n}{\sigma_x^2} \pm \frac{z_{1-\alpha/2}}{\sqrt{\frac{n}{\sigma_x^2} + \frac{n}{\sigma_y^2}}}$</td>
<td>Beta distribution</td>
</tr>
<tr>
<td>$\hat{p}_B = \sum y_i + 1 / n + 2$</td>
<td>Proportion of binary data</td>
</tr>
<tr>
<td>$\hat{p}_B = \sum y_i + \alpha / n + \alpha + \beta$</td>
<td></td>
</tr>
<tr>
<td>$S^2_1 / S^2_2 F_{\alpha/2, n} + S^2_2 F_{1-\alpha/2}$</td>
<td>ANOVA</td>
</tr>
<tr>
<td>$\chi^2 = \frac{(n - 1)S^2}{\sigma^2}$</td>
<td>Chi-square test</td>
</tr>
<tr>
<td>$F = \frac{S^2_1 / \sigma^2_1}{S^2_2 / \sigma^2_2}$</td>
<td>ANOVA</td>
</tr>
<tr>
<td>$\frac{[d(t/\theta)]^2}{-nE \frac{d^2 \ln f(y/\theta)}{d\theta^2}}$</td>
<td></td>
</tr>
<tr>
<td>$n = \frac{(z_{1-\alpha} + z_{1-\beta})^2 \sigma^2}{m^2}$</td>
<td>Sample size</td>
</tr>
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</table>