# Formulas Master File

Chapter 1 Introduction and Descriptive Statistics

NONE.

**Chapter 2** **Frequency Distributions in Tables and Graphs**

 (Frequency)

 (Relative frequency)

 (Relative percent)

**Chapter 3 Summarizing Data: Center Tendency**

 (Population mean)

 (Sample mean)

 (Weighted sample mean)

**Chapter 4** **Summarizing Data: Variability**

 (Range)

 (Interquartile range)

 (Semi-interquartile range)

 (Definitional formula for the sum of squares in a population)

 (Computational formula for the sum of squares in a population)

 (Population variance)

 (Population standard deviation)

 (Definitional formula for sum of squares in a sample)

 (Computational formula for sum of squares in a sample)

 (Degrees of freedom for sample variance)

 (Sample variance)

 (Sample standard deviation)

**Chapter 5 Probability**

 (Simple probability)

 (Bayes’ theorem)

 (Mean of a probability distribution)

 (Variance of a probability distribution)

 (Standard deviation of a probability distribution)

 (Computing formula for variance of a probability distribution)

 (Computing formula for standard deviation of a probability distribution)

 (Mean of a binomial probability distribution)

 (Variance of a binomial probability distribution)

 (Standard deviation of a binomial probability distribution)

**Chapter 6 Probability, Normal Distributions, and *z* Scores**

 (z transformation for a population of scores)

 (z transformation for a sample of scores)

**Chapter 7 Probability and Sampling Distributions**

 (*z* transformation for a population of scores)

 (*z* transformation for a sample of scores)

 (*z* transformation for a distribution of sample means)

 (Standard error of the mean)

**Chapter 8 Hypothesis Testing: Significance, Effect Size, and Power**

 (Test statistic for the one–sample *z* test)

 (Cohen’s *d* effect size measure for the one-sample *z* test)

**Chapter 9 Testing Means: One-Sample and Two-Independent-Sample *t* Tests**

## One–Sample *t*

 (Test statistic for the one–sample *t* test)

 (Estimated standard error)

 (Degrees of freedom for the one–sample *t* test)

## Two–Independent Sample *t*

 (Test statistic for the two–independent sample *t* test)

 (Estimated standard error for the difference)

 (Pooled sample variance for unequal sample sizes)

 (Degrees of freedom for the two–independent sample *t* test)

## Effect Size

 (Estimated Cohen’s *d* for the one–sample *t* test)

 (Estimated Cohen’s *d* for the two–independent sample *t* test)

 (Eta-squared estimate of proportion of variance; used for all *t* tests)

 (Omega-squared estimate of proportion of variance; used for all *t* tests)

**Chapter 10 Testing Means: The Related-Samples *t* Test**

## Related Samples *t*

 (Test statistic for the related samples *t* test)

 (Estimated standard error for difference scores)

 (Degrees of freedom for related samples *t* test)

## Effect Size

 (Estimated Cohen’s *d* for related samples *t* test)

 (Eta-squared estimate of proportion of variance; used for all *t* tests)

 (Omega-squared estimate of proportion of variance; used for all *t* tests)

**Chapter 11 Estimation and Confidence Intervals**

 (The estimation formula for a one–sample *z* test)

 (The estimation formula for a one–sample *t* test)

 (The estimation formula for a two–independent sample *t* test)

 (The estimation formula for a related samples *t* test)

**Chapter 12 Analysis of Variance: One-Way Between-Subjects Design**

## Table for One-Way Between-Subjects ANOVA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Source of Variation** | ***SS*** | ***df*** | ***MS*** | ***Fobt*** |
| Between groups |  | *k* – 1 |  |  |
| Within groups (error) |  | *N* – *k* |  |  |
| Total |  | *N* – 1 |  |  |

## Between-Subjects Design

 (Test statistic for the one-way between-subjects ANOVA)

 (Mean square for each source of variation; used for all ANOVA tests)

 (Degrees of freedom between groups)

 (Degrees of freedom error)

 (Degrees of freedom total)

## Effect Size (Between-Subjects Design)

 (Eta-squared estimate for proportion of variance)

 (Omega-squared estimate for proportion of variance)

## Post Hoc Tests

 (Fisher’s LSD formula)

 (Tukey’s HSD formula)

**Chapter 13 Analysis of Variance: One-Way Within-Subjects (Repeated-Measures) Design**

## Table for One-Way Within-Subjects (Repeated-Measures) ANOVA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source of Variation | SS | df | MS | Fobt |
| Between groups |  | *k* 1 |  |  |
| Between persons |  | *n* 1 |  |  |
| Within groups (error) |  | (*k* 1) (*n* 1) |  |  |
| Total |  | (*kn* 1) |  |  |

## Within-Subjects Design

 (Test statistic for the one-way within-subjects ANOVA)

 (Degrees of freedom between groups)

 (Degrees of freedom between persons)

 (Degrees of freedom error)

 (Degrees of freedom total)

## Effect Size (Within-Subjects Design)

 (Partial eta-squared)

 (Partial omega-squared)

**Chapter 14 Analysis of Variance: Two-Way Between-Subjects Factorial Design**

## ANOVA Table for Two-Way Between-Subjects Factorial Design

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source of Variation | SS | df | MS | F |
| Factor A |  | *p*–1 |  |  |
| Factor B |  | *q*–1 |  |  |
| A × B |  |  |  |  |
| Error (within groups) |  |  |  |  |
| Total |  |  |  |  |

## Between-Subjects Design

(Test statistic for the main effect of Factor A)

(Test statistic for the main effect of Factor B)

(Test statistic for the A × B interaction)

 (Degrees of freedom for Factor A)

 (Degrees of freedom for Factor B)

 (Degrees of freedom for the A × B interaction)

 (Degrees of freedom error)

 (Degrees of freedom total)

## Effect Size (Two-Way Between-Subjects ANOVA)

,  (Eta-squared for main effects)

 (Eta-squared for the interaction)

,  (Omega-squared for main effects)

 (Omega-squared for the interaction)

**Chapter 15 Correlation**

## Correlation Coefficients

(Pearson correlation coefficient)

 (Spearman rank-order correlation coefficient)

 (Point-biserial correlation coefficient)

 (Phi correlation coefficient)

## Converting the Correlation Coefficient (*r*) to *t* and χ2

 (Formula for converting *r* to *t*)

 (Formula for converting *r* to χ2)

## Effect Size

 (The coefficient of determination)

**Chapter 16 Linear Regression and Multiple Regression**

## Method of Least Squares

*Y* = *bX*  *a* (Linear equation for a straight line)

 (Slope of a straight line)

 (*y*-intercept for a straight line)

## Analysis of Regression

 (Test statistic for analysis of regression and multiple regression)

*df*regression  1 (Degrees of freedom regression with one predictor variable)

*df*residual  *n*2 (Degrees of freedom residual)

 (Standard error of estimate)

**Chapter 17 Nonparametric Tests: Chi-Square Tests**

## Chi-Square Tests

 (Test statistic for the chi-square goodness-of-fit test and the chi-square test for independence)

 (Degrees of freedom for the chi-square goodness-of-fit test)

 (Degrees of freedom for the chi-square test for independence)

## Effect Size (Chi-Square Test for Independence)

 (Effect size using the proportion of variance)

 (Effect size using the phi coefficient)

 (Effect size using Cramer’s *V*)

**Chapter 18 Nonparametric Tests: Tests for Ordinal Data**

## The Sign Test

 (Test statistic for the normal approximation of the sign test)

## Wilcoxon Signed-Ranks T Test

 (Test statistic for the normal approximation of the Wilcoxon T)

 (The mean for the test statistic T)

 (The standard deviation for the test statistic T)

## Mann-Whitney *U* Test

 (Test statistic for the normal approximation of the Mann-Whitney *U*)

 (The mean for the test statistic *U*)

 (The standard deviation for the test statistic *U*)

## The Kruskal-Wallis *H* Test

 (Test statistic for the Kruskal-Wallis *H* test)

## The Friedman Test

 (Test statistic for the Friedman test)