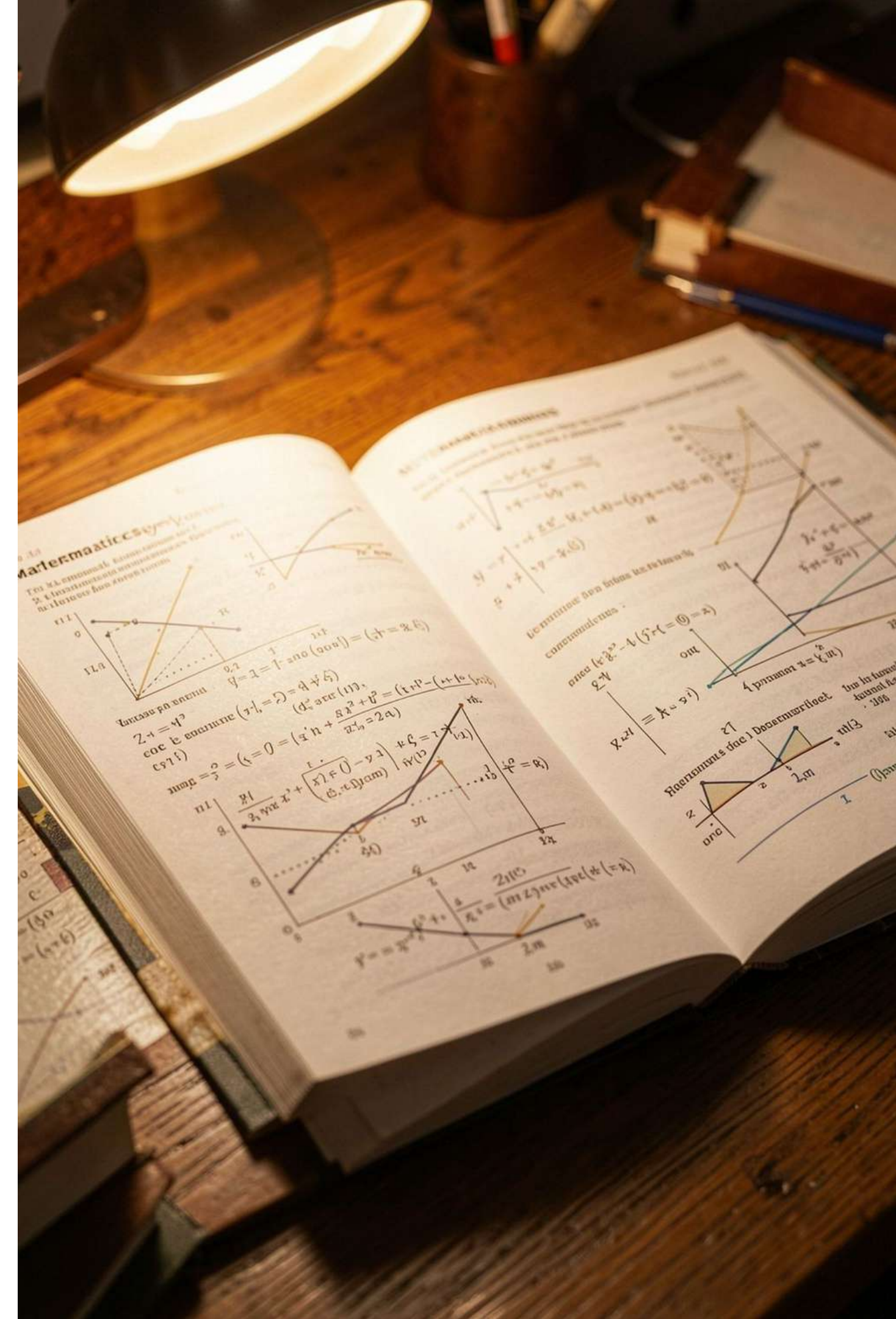




Comprehensive Statistics Formula Handbook

From Foundational Concepts to Advanced
Inferential Analysis

Prepared by: [GoTakeMyOnlineClass](#) Academic Support Team



Introduction

Statistics is the backbone of modern data science, research, and business decision-making. Whether you are navigating introductory high school probability or tackling complex university-level regression modeling, having the right mathematical tools at your fingertips is essential.

How to use this guide:

Identify your goal

Determine if you are describing a data set, calculating probability, or making inferences about a population.

Verify your variables

Ensure you are using the correct notation (e.g., sample vs. population).

Master the workflow

Use these formulas in conjunction with our expert exam services if you require real-time support during high-stakes testing.

📌 *Success in statistics is not just about memorizing these formulas; it is about knowing which one to apply. Keep this guide nearby as you study.*

DETAILED FORMULA COLLECTION

1. Descriptive Statistics

- **Sample Mean ($\bar{x}$):** $\frac{\sum x}{n}$
- **Population Mean (μ):** $\frac{\sum x}{N}$
- **Weighted Mean:** $\frac{\sum(w \cdot x)}{\sum w}$
- **Sample Variance (s^2):** $\frac{\sum(x - \bar{x})^2}{n-1}$
- **Sample Std. Dev (s):** $\sqrt{s^2}$
- **Population Variance (σ^2):** $\frac{\sum(x - \mu)^2}{N}$
- **Population Std. Dev (σ):** $\sqrt{\sigma^2}$
- **Coefficient of Variation (CV):** $(\frac{s}{\bar{x}}) \times 100$
- **Interquartile Range (IQR):** $Q_3 - Q_1$
- **Z-Score (Standard Score):** $z = \frac{x - \mu}{\sigma}$

2. Probability & Counting

- **Complement Rule:** $P(A^c) = 1 - P(A)$
- **General Addition Rule:** $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- **Conditional Probability:** $P(A|B) = \frac{P(A \cap B)}{P(B)}$
- **Bayes' Theorem:** $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$
- **Permutations:** $nPr = \frac{n!}{(n-r)!}$
- **Combinations:** $nCr = \frac{n!}{r!(n-r)!}$

3. Discrete & Continuous Distributions

- **Binomial Mean:** $\mu = np$
- **Binomial Variance:** $\sigma^2 = np(1 - p)$
- **Poisson Probability:** $P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$
- **Expected Value (Discrete):** $E(X) = \sum[x \cdot P(x)]$
- **Variance (Discrete):** $Var(X) = \sum[(x - E(X))^2 \cdot P(x)]$

4. Sampling & Inferential Statistics

- **Standard Error of Mean ($\sigma_{\bar{x}}$):** $\frac{\sigma}{\sqrt{n}}$
- **CLT (Sample Mean Distribution):** $\bar{x} \approx N(\mu, \frac{\sigma}{\sqrt{n}})$
- **Confidence Interval (Mean, σ known):** $\bar{x} \pm z^* (\frac{\sigma}{\sqrt{n}})$
- **Confidence Interval (Mean, σ unknown):** $\bar{x} \pm t^* (\frac{s}{\sqrt{n}})$
- **Confidence Interval (Proportion):** $\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
- **Sample Size (Mean):** $n = (\frac{z^* \cdot \sigma}{E})^2$

5. Hypothesis Testing

- **One-Sample Z-Test:** $z = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}}$
- **One-Sample T-Test:** $t = \frac{\bar{x} - \mu_0}{s / \sqrt{n}}$
- **Difference of Two Means (Indep):** $t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$
- **Chi-Square Statistic:** $\chi^2 = \sum \frac{(O - E)^2}{E}$

6. Regression, Correlation & ANOVA

- **Correlation Coefficient (r):**
$$\frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$
- **Simple Linear Regression:** $\hat{y} = a + bx$
- **Regression Slope (b):** $b = r\left(\frac{s_y}{s_x}\right)$
- **Y-Intercept (a):** $a = \bar{y} - b\bar{x}$
- **Coefficient of Determination (r^2):** SSR/SST
- **ANOVA F-Statistic:** $F = \frac{MS_{between}}{MS_{within}}$
- **Degrees of Freedom (Regression):** $df_{error} = n - 2$



Need Expert Help With Your Statistics Exam?

If you are facing a high-stakes exam and the formulas above still feel overwhelming, don't take the risk alone. [GoTakeMyOnlineClass](#) provides professional, confidential exam assistance for students at all levels.

Whether you are struggling with hypothesis testing, require someone to handle your StatCrunch/SPSS software assessments, or have a proctored final exam, our experts are here to help you achieve the grades you need.

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Check our complete Statistics Formula Checklist regularly to ensure you are fully prepared for every test.