

Statistics Cheat Sheet for Interviews

1. Basics

- Population = entire dataset | Sample = subset of population
- Parameter = population measure | Statistic = sample measure

2. Types of Data

- Qualitative → Nominal (colors), Ordinal (ranks)
- Quantitative → Discrete (counts), Continuous (height, weight)

3. Descriptive Statistics

- Mean, Median, Mode
- Variance, Standard Deviation (σ), Range, IQR

4. Probability Basics

- $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ | $P(A \cap B) = P(A)P(B|A)$
- Bayes: $P(A|B) = P(B|A)P(A)/P(B)$

5. Distributions

- Normal (bell curve), Bernoulli (0/1), Binomial (#successes),
- Poisson (rare events), Uniform (equal chance), Exponential (time to event)

6. Hypothesis Testing

- Null (H_0): no effect | Alternative (H_1): effect exists
- p-value < 0.05 → reject H_0
- Type I Error (false positive) | Type II Error (false negative)

7. Confidence Intervals

- CI = estimate \pm margin of error
- 95% CI → 95% intervals contain true parameter

8. Correlation & Regression

- Correlation (r : -1 to 1), Covariance
- Linear Regression: $y = \beta_0 + \beta_1 x + \varepsilon$ | R^2 = variance explained