schaum's outines

PROBABILITY AND STATISTICS

Second Edition

MURRAY R. SPIEGEL

JOHN SCHILLER

R. ALU SRINIVASAN

760 fully-solved problems

Modern terminology and notation

Easy-to-understand methodology

Perfect for pre-test review

Use with these courses: Introduction to Probability & Statistics

Probability

Business Statistics Basic Statistics

Beginning Statistics



rait 1	- LYONADILIII
CHAPTER 1 smm shad	Probability. Some Important Theorems on Probability. Assignment of Probabilities. Conditional Probability. Theorems on Conditional
CHAPTER 2	Random Variables and Probability Distributions Random Variables. Discrete Probability Distributions. Distribution Functions for Random Variables. Distribution Functions for Discete Random Variables. Continuous Random Variables. Graphical Intepretations. Joint Distributions. Independent Random Variables. Change of Variables. Probability Distributions of Functions of Random Variables. Convolutions. Conditional Distributions. Applications to Geometric Probability.
CHAPTER 3	Mathematical Expectation 78

Random Variables. Some Theorems on Expectation. The Variance and Standard Deviation. Some Theorems on Variance. Standardized Random Variables. Moments. Moment Generating Functions. Some Theorems on Moment Generating Functions. Characteristics Functions. Variance for Joint Distributions. Covariance. Correlation Coefficient. Conditional Expectation, Variance, and Moments. Chebyshev's Inequality. Law of Large Numbers. Other Measures of Central Tendency. Percentiles. Other Measures of Dispersion. Skewness and Kurtosis.

Definition of Mathematical Expectation. Functions of

CHAPTER 4

Special Probability Distributions

113

The Binomial Distribution. Some Properties of the Binomial Distribution. The Law of Large Numbers for Bernoulli Trials. The Normal Distribution. Properties of the Normal Distribution. Relation Between Binomial and Normal Distributions. The Poisson Distribution. Some Properties of the Poisson Distribution. Relation Between the Binomial and Poisson Distribution. Relation Between the Poisson and Normal Distributions. The Central Limit Theorem. The Multinomial Distribution. The Hypergeometric Distribution. The Uniform Distribution. The Cauchy Distribution. The Gamma Distribution. The Beta Distribution. The Chi-Square Distribution. Student's t Distribution. The F Distribution. Relationships Among Chi-Square, t, and F Distributions. The Bivariate Normal Distribution. Miscellaneous Distributions.

Part II

STATISTICS

159

CHAPTER 5

Sampling Theory

161

Population and Sample. Statistical Interference.
Sampling With and Without Replacement. Random
Samples. Random Numbers. Population
Parameters. Sample Statistics. Sampling
Distributions. The Sample Mean. Sampling
Distribution of Means. Sampling Distribution of
Proportions. Sampling Distribution of Differences and
Sums. The Sample Variance. Sampling Distribution
of Variances. Case where Population Variance Is
Unknown. Sampling Distribution of Ratios of
Variances. Other Statistics. Frequency Distributions.
Relative Frequency Distributions. Computation of
Mean, Variance, and Moments for Grouped Data.

CHAPTER 6

Estimation Theory

205

Unbiased Estimates and Efficient Estimates. Point Estimates and Interval Estimates. Reliability. Confidence Interval Estimates of Population Parameters. Confidence Intervals for Means. Confidence Intervals for Proportions. Confidence Intervals for Differences and Sums. Confidence Intervals for the Variance of a Normal Distribution. Confidence Intervals for Variance Ratios. Maximum Likelihood Estimates.

CONTENTS vii

CHAPTER 7

Tests of Hypotheses and Significance

Statistical Decisions. Statistical Hypotheses. Null Hypotheses. Tests of Hypotheses and Significance. Type I and Type II Errors. Level of Significance. Tests Involving the Normal Distribution. One-Tailed and Two-Tailed Tests. P Value. Special Tests of Significance for Large Samples. Special Tests of Significance for Small Samples. Relationship Between Estimation Theory and Hypothesis Testing. Operating Characteristic Curves. Power of a Test. Quality Control Charts. Fitting Theoretical Distributions to Sample Frequency Distributions. The Chi-Square Test for Goodness of Fit. Contingency Tables. Yates' Correction for Continuity. Coefficient of Contingency.

CHAPTER 8

Curve Fitting, Regression, and Correlation

278

Curve Fitting. Regression. The Method of Least Squares. The Least-Squares Line. The Least-Squares Line in Terms of Sample Variances and Covariance. The Least-Squares Parabola. Multiple Regression. Standard Error of Estimate. The Linear Correlation Coefficient. Generalized Correlation Coefficient. Rank Correlation. Probability Interpretation of Regression. Probability Interpretation of Correlation. Sampling Theory of Regression. Sampling Theory of Correlation. Correlation and Dependence.

CHAPTER 9

Analysis of Variance

328

The Purpose of Analysis of Variance. One-Way Classification or One-Factor Experiments. Total Variation. Variation Within Treatments. Variation Between Treatments. Shortcut Methods for Obtaining Variations. Linear Mathematical Model for Analysis of Variance. Expected Values of the Variations. Distributions of the Variations. The F Test for the Null Hypothesis of Equal Means. Analysis of Variance Tables. Modifications for Unequal Numbers of Observations. Two-Way Classification or Two-Factor Experiments. Notation for Two-Factor Experiments. Variations for Two-Factor Experiments. Analysis of Variance for Two-Factor Experiments. Two-Factor Experiments with Replication. Experimental Design.

CHAPTER 10	Nonparametric Tests Introduction. The Sign Test. The Mann-Whitne Test. The Kruskal-Wallis H Test. The H Test Corrected for Ties. The Runs Test for Randomne Further Applications of the Runs Test. Spearman Rank Correlation.	ess.
	Appendix A Mathematical Topics	389
	Appendix B Ordinates (y) of the Standard Normal Curve at z	392
	Appendix C Areas under the Standard Normal Curve from 0 to	393 o z
	Appendix D Percentile Values t_p for Student's t Distribution with ν Degrees of Freedom	394
	Appendix E Percentile Values χ_p^2 for the Chi-Square Distribution with ν Degrees of Freedom	395
	Appendix F 95th and 99th Percentile Values for the F Distribution with ν_1 , ν_2 Degrees of Freedom	396
	Appendix G Values of $e^{-\lambda}$	
	Appendix H Random Numbers	399
	SUBJECT INDEX	401
	THREY FOR SOLVED PROBLEMS	407

Master probability with Schaum's the high-performance study guide. It will help you study efficiently, develop problem-solving skills, and achieve your personal best on exams!



OVER 30 MILLION SOLD

Students love Schaum's Outlines because they produce results. Each year, hundreds of thousands of students improve their test scores and final grades with these indispensable study guides.

Get the edge on your classmates. Use Schaum's!

If you don't have a lot of time but want to excel in class, use this book to:

- · Brush up before tests
- Find answers fast
- · Study quickly and more effectively
- Get the big picture without spending hours poring over lengthy textbooks

Schaum's Outlines give you the information your teachers expect you to know in a handy and succinct format—without overwhelming you with unnecessary detail. You get a complete overview of the subject. Plus, you get plenty of practice exercises to test your skill. Compatible with any classroom text, Schaum's let you study at your own pace and remind you of all the important facts you need to remember—fast! And Schaum's are so complete, they're perfect for preparing for graduate or professional exams.

Inside you will find:

- 760 fully-worked problems with step-by-step solutions
- Hundreds of additional practice problems with answers
- Coverage of all course fundamentals
- Easy-to-understand methodology

If you want top grades and a thorough understanding of probability and statistics, this powerful study tool is the best tutor you can have!

Chapters include: Basic Probability • Random Variables and Probability Distributions • Mathematical Expectation • Special Probability Distributions • Sampling Theory • Estimation Theory • Tests of Hypotheses and Significance • Curve Fitting, Regression, and Correlation • Analysis of Variance • Nonparametric Tests

Visit us on the World Wide Web at www.schaums.com

McGraw-Hill

A Division of The McGraw-Hill Companies

\$16.95 U.S.A.





Related Titles in Schaum's Outlines **Mathematics & Statistics**

Advanced Calculus Advanced Mathematics for Engineers & Scientists **Analytic Geometry**

Basic Mathematics for Electricity & Electronics,

2nd Ed.

Basic Mathematics with Applications to Science and Technology, 2nd Ed.

Saloulus, 2nd Ed.

Beginning Calculus, 2nd Ed.

Beginning Linear Algebra Beginning Statistics Boolean Algebra & Switching Circuits

Calculus, 4th Ed.

Calculus for Business, Economics, and the Social Sciences

Calculus of Finite Differences & Difference Equations

College Algebra, 2nd Ed.
 College Mathematics, 2nd Ed.

Complex Variables

Differential Equations, 2nd Ed.

Differential Equations, 2nd Ed.
Differential Geometry
Discrete Mathematics, 2nd Ed.
Elementary Algebra, 2nd Ed.
Elementary Mathematics, Review of
(including Arithmetic), 2nd Ed.
Elements of Statistics I: Descriptive
Statistics and Probatics

Elements of Statistics II: Inferential

Finite Element Analysis Finite Mathematics, 2nd Ed.

General Topology

Geometry, 3rd Ed

Group Theory

Intermediate Algebra

Introduction to Probability and

Laplace Transforms

Linear Algebra, 2nd Ed.

and Tables, 2nd Ed. Mathematical Methods for Business

and Economics

Matrix Operations

Partial Differential Equations

Probability, 2nd Ed. Probability, Random Variables, &

Random Processes Real Variables

Set Theory & Related Topics, 2nd

Statistics, 3rd Ed. Tensor Calculus

Trigonometry, 3rd Ed.

Understanding Calculus Concepts

A bullet (•) next to a title indicates that a Schaum's **Electronic Tutor is also** available.