

# Notes on Discrete Probability

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## 1 Probability

- $P(S^c) = 1 - P(S)$ .
- $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ .
- For any events  $A, B, C$ ,

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C).$$

- **Definition:** The probability of  $A$  given  $B$  is  $P(A|B) = \frac{P(A \cap B)}{P(B)}$ .
- **Definition:** Events  $\{A_i\}_{i=1}^n$  are called **independent** if  $P(\bigcap_{i=1}^n A_i) = \prod_{i=1}^n P(A_i)$ .
- Let  $\{A_i\}_{i=1}^n$  be a partition of the sample space  $S$ . Then, for any event  $E$ ,

$$\begin{aligned} P(E) &= \sum_{j=1}^n P(E \cap A_j) \\ &\Rightarrow P(E) = \sum_{j=1}^n P(E|A_j)P(A_j). \end{aligned}$$

- Let  $E$  be an event, and  $\{A_i\}_{i=1}^n$  be a partition of the sample space  $S$ . Then,

$$P(A_i|E) = \frac{P(A_i \cap E)}{P(E)} = \frac{P(E|A_i)P(A_i)}{\sum_{j=1}^n P(E|A_j)P(A_j)}.$$

# Actuary Probability Exam Notes

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Author Fred Szabo has directed the Actuarial Co op Program at Concordia for over fifteen years    **Comprehensive**

**Probability Review for Actuarial Exams** Ryan Lloyd,2010-08-20 Prepare for the first actuarial test with this probability study manual from Digital Actuarial Resources This book covers in great detail all the probability material featured on the first exam from the SOA CAS Topics covered include set theory counting tools various discrete and continuous probability distributions measures of a distribution and multivariate distributions to name a few The manual gives detailed explanations and many examples to support the material The book explains probability from the bottom up so no previous knowledge of probability is required    Actuarial Models Vladimir I. Rotar,2014-08-18 Actuarial Models The Mathematics of Insurance Second Edition thoroughly covers the basic models of insurance processes It also presents the mathematical frameworks and methods used in actuarial modeling This second edition provides an even smoother more robust account of the main ideas and models preparing students to take exams of the Society    Risk Classification in Life Insurance J. David Cummins,B.D.

Smith,R.N. Vance,J.L. Vanderhel,2013-03-09 The research project leading to this book was initiated in the fall of 1979 when the American Council of Life Insurance ACLI contacted Dan McGill chairman of the Wharton School Insurance Department about conducting a study on risk classification in life insurance The ACLI was concerned about legislative and judicial activity in this area and its potential effects on the life insurance industry A meeting was held at the ACLI offices in Washington D C between several members of the ACLI staff and Dan McGill and David Cummins representing the Wharton School insurance department An agreement was reached that a study would be conducted at Wharton dealing with issues in risk classification Although the staff of the ACLI suggested directions the study might take it was agreed that the design and execution of the study would be solely under the control of the researchers The researchers also retained unrestricted publication rights in the results of the study This agreement has been honored by the ACLI during the course of the project [Actex Study Manual, Course 4 Examination of the Society of Actuaries, Exam 4 of the Casualty Actuarial Society](#) Samuel A.

Broverman,2001 **Actex Study Manual, Course 1 Examination of the Society of Actuaries, Exam 1 of the Casualty Actuarial Society** Samuel A. Broverman,2001 [Actex Study Manual, Course 3 Examination of the Society of Actuaries, Exam 3 of the Casualty Actuarial Society: -3. Sample examinations and solutions](#) Michael A. Gauger,2001

**Fundamentals of Actuarial Mathematics** S. David Promislow,2015-01-20 Provides a comprehensive coverage of both the deterministic and stochastic models of life contingencies risk theory credibility theory multi state models and an introduction to modern mathematical finance New edition restructures the material to fit into modern computational methods and provides several spreadsheet examples throughout Covers the syllabus for the Institute of Actuaries subject CT5 Contingencies Includes new chapters covering stochastic investments returns universal life insurance Elements of option pricing and the Black Scholes formula will be introduced [Survival Analysis](#) Sam Efromovich,2025-04-30 This textbook provides a unified account of estimating the survival function hazard rate cumulative hazard density regression conditional distributions and linear functionals for the current status censored and right censored data The book contains the theory and methodology of efficient estimation adaptation dimension reduction and confidence bands as well as the universal E estimator for small samples Exercises and a large number of simulated and real life examples that can be repeated and modified using the complementary R package are also included This coverage together with the intuitive style of presentation is ideal for people entering this field The context is suitable for self study or a one semester course for graduate students with majors ranging from biostatistics and data analytics to econometrics and actuarial science **Transactions - Society of Actuaries** Society of Actuaries,1985 Beginning with vol for 1951 includes section Reports of mortality and morbidity experience [Introduction to Modern Cryptography](#) Jonathan Katz,Yehuda Lindell,2007-08-31 Cryptography plays a key role in ensuring the privacy and integrity of data and the security of computer networks Introduction to Modern Cryptography provides a rigorous yet accessible treatment of modern cryptography with a focus on formal definitions precise

assumptions and rigorous proofs The authors introduce the core principles of modern cryptography including the modern computational approach to security that overcomes the limitations of perfect secrecy An extensive treatment of private key encryption and message authentication follows The authors also illustrate design principles for block ciphers such as the Data Encryption Standard DES and the Advanced Encryption Standard AES and present provably secure constructions of block ciphers from lower level primitives The second half of the book focuses on public key cryptography beginning with a self contained introduction to the number theory needed to understand the RSA Diffie Hellman El Gamal and other cryptosystems After exploring public key encryption and digital signatures the book concludes with a discussion of the random oracle model and its applications Serving as a textbook a reference or for self study Introduction to Modern Cryptography presents the necessary tools to fully understand this fascinating subject

**Actuarial Mathematics:**

**Chapters 3-10** Newton L. Bowers,1984    Trade Union Study Notes ,1904    *Legal Notes & Viewpoints Quarterly* ,1985

Contains articles outlines and checklists selected from the Institute s course handbooks    The Record [of The] American Institute of Actuaries American Institute of Actuaries,1928    *Study Manual for SOA Exam MFE* Abraham Weishaus,2007

**Transactions of the 21st International Congress of Actuaries, Zurich and Lausanne, 19th-26 June, 1980** ,1980

*Study Manual for SOA Exam MLC* Abraham Weishaus,2007    **Digital Actuarial Resources** Digital Actuarial

Resources,2005-10 Digital Actuarial Resources published a short study guide for Exam FM 2 offered through the Society of Actuaries and the CAS This study guide contains all the financial mathematics equations that you need to know for Exam FM The study guide is 19 pages with 180 formulas The guide covers the following topics Basic Interest Equations Annuities Cash Flows Loans Bonds and Stocks

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