Exam P   Probability

Exam P is a three-hour multiple choice examination and is identical to CAS Exam 1. The examination is jointly sponsored and administered by the SOA, CAS, and the Canadian Institute of Actuaries (CIA). The examination is also jointly sponsored by the American Academy of Actuaries (AAA) and the Conference of Consulting Actuaries (CCA).

Exam P is administered as a computer-based test. For additional details, Please refer to "Computer-Based Testing Rules and Procedures". (http://www.beanactuary.org/exams/cbt.cfm)

The purpose of the syllabus for this examination is to develop knowledge of the fundamental probability tools for quantitatively assessing risk. The application of these tools to problems encountered in actuarial science is emphasized. A thorough command of the supporting calculus is assumed. Additionally, a very basic knowledge of insurance and risk management is assumed.

A table of values for the normal distribution is available below for candidates to download and will be included with the examination. Since the table will be included with the examination, candidates will not be allowed to bring copies of the table into the examination room.

Check the Updates section on this exam's home page for any changes to the exam or syllabus.

LEARNING OUTCOMES

Candidates should be able to use and apply the following concepts in a risk management context:

1. General Probability

    - Set functions including set notation and basic elements of probability
    - Mutually exclusive events
    - Addition and multiplication rules
    - Independence of events
    - Combinatorial probability
    - Conditional probability
    - Bayes Theorem / Law of total probability

2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, chi-square, beta, Pareto, lognormal, gamma, Weibull, and normal)

    - Probability functions and probability density functions
    - Cumulative distribution functions
    - Mode, median, percentiles, and moments
    - Variance and measures of dispersion
    - Moment generating functions
    - Transformations

3. Multivariate probability distributions (including the bivariate normal)

    - Joint probability functions and joint probability density functions
    - Joint cumulative distribution functions
    - Central Limit Theorem
    - Conditional and marginal probability distributions

- Moments for joint, conditional, and marginal probability distributions
- Joint moment generating functions
- Variance and measures of dispersion for conditional and marginal probability distributions
- Covariance and correlation coefficients
- Transformations and order statistics
- Probabilities and moments for linear combinations of independent random variables

REFERENCES

Suggested Texts

There is no single required text for this exam. Periodically the list of representative texts is updated. There is no advantage to selecting the text just added or to stop studying from a text that has been deleted. The texts listed below may be considered as representative of the many texts available to cover material on which the candidate may be examined.

Not all the topics may be covered adequately by just one text. Candidates may wish to use more than one of the following or other texts of their choosing in their preparation. Earlier or later editions may also be adequate for review. The # indicates new or updated material.

- *A First Course in Probability* (Eighth Edition), 2009, by Ross, S.M., Chapters 1–8.
- *Fundamentals of Probability with Stochastic Processes,* (Third Edition), 2005, by Ghahramani, S., Chapters 1–11.
- *John E. Freund's Mathematical Statistics with Applications* (Seventh Edition), 2004, by Miller, I., Miller, M., Chapters 1-8.
- *Mathematical Statistics with Applications* (Seventh Edition), 2008*,* by Wackerly, D., Mendenhall III, W., Scheaffer*,* R., Chapters 1-7.
- *Probability for Risk Management*, (Second Edition), 2006, by Hassett, M. and Stewart, D., Chapters 1–11.
- *Probability: The Science of Uncertainty with Applications to Investments, Insurance and Engineering* 2001, by Bean, M.A., Chapters 1–9.

Study Notes

The candidate is expected to be familiar with the concepts introduced in "Risk and Insurance".

Code	Title
	Tables for Exam P
	Exam P Sample Questions and Solutions (1–142)
P-21-05	Risk and Insurance