Introduction to Actuarial Exams Workshop

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Agenda

- Introduction to Actuarial Exams
- Exam Registration
- Exam Study Plan
- What You Should Know About Exam Day

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Introduction to Actuarial Exams

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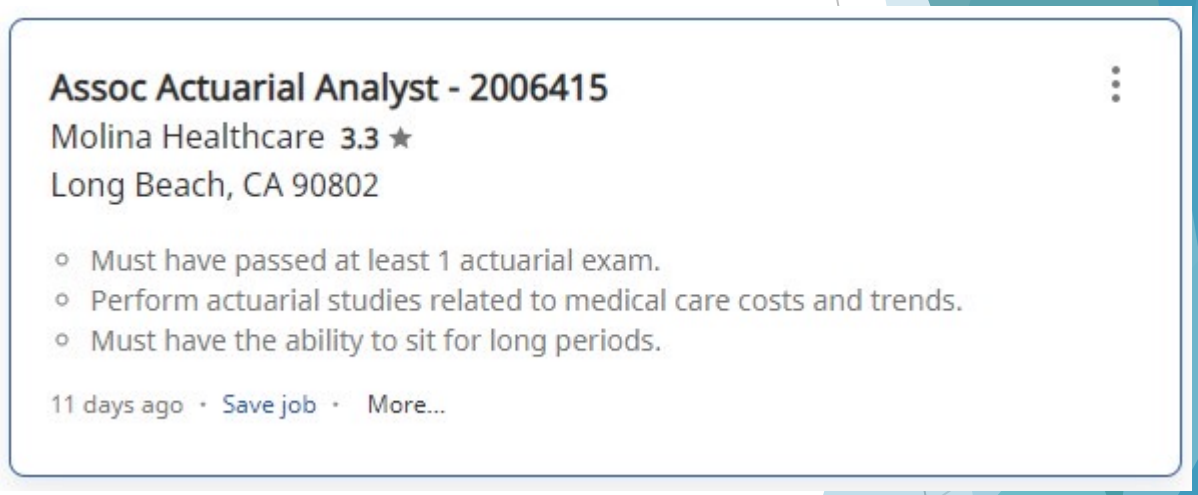
Why Take Actuarial Exams?

- Exams are necessary to be an actuary
  - Many internships are given only to those with exams passed
- More Information on BAS, SOA, and CAS website
- Typical exam schedule:
  - First Internship: 1-2 exams (FM or P)
  - Before Graduation: 2-3 exams (P, FM, and IFM)



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SOA vs CAS

SOA

- Industry: Life/Health/Pension/Retirement
- Associate of the Society of Actuaries (ASA): first 7 exams
- Fellow of the Society of Actuaries (FSA): 6 specialty tracks, 3 exams

SOCIETY OF ACTUARIES

CAS

- Industry: Property & Casualty (P&C)
- Associate of the Society of Actuaries (ACAS): first 7 exams
- Fellow of the Casualty Actuarial Society (FCAS): 3 exams

CAS

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Exam P: Probability

- Fundamental probability tools used for quantitatively assessing risk
- Usually the first actuarial exam (can also take FM first)
- Exam Fees: $250
- 3-hour exam, 30 multiple-choice questions
- Average passing rate: 42%
- Pass Mark: 71% (equivalent to >22/30)
- Score Scale: 0-10 (at least 6 to pass)

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Exam FM: Financial Mathematics

- Fundamental concepts used in calculating present/accumulated values for cash flows
- Exam Fees: $250
- 3-hour exam, 35 multiple-choice questions
- Average passing rate: 48%
- Pass Mark: 70% (equivalent to >25/35)
- Score Scale: 0-10 (at least 6 to pass)

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Exam IFM: Investment and Financial Markets

- Theoretical basis of corporate finance, financial models, and the application of those models to insurance and other financial risks
- Exam Fees: $300 (student fee), $350 (non-student fee)
- Knowledge of Exam P, Exam FM, and VEE Accounting and Corporate Finance is assumed
- 3-hour exam, 30 multiple-choice questions
- Average passing rate: 51%

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Recent Changes

- Exam P and FM will require less preparation (more accessible and elimination of outdated content)
- Exam IFM eliminated (shift in ASA pathway towards data analytics and certain key concepts will be tested elsewhere in the pathway)
- Exams LTAM and STAM will be replaced with new exams:
  - Fundamentals of Actuarial Mathematics (FAM)
  - Choice of either Advanced Long-Term Actuarial Mathematics (ALTAM) or Advanced Short-Term Actuarial Mathematics (ASTAM)
- Introduction of a new course- Introduction of Advanced Topics in Predictive Analytics (ATPA) (increasing our already strong data analytics coverage)
- Two new e-Learning modules (offering an increasing emphasis on AQ/EQ topics) with a shorter, streamlined FAP course
- VEE requirements, Exam SRM, Exam PA, and APC seminar remain unchanged
- For more information, see this link

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Recent Changes

- IFM/ATPA Considerations

  The requirements for ASA, and therefore for FSA by implication, will be having credit for either IFM or ATPA. Any candidate earning an ASA based on IFM will not be required to pass ATPA to earn an FSA. In 2022, candidates will have a choice of these two exams, but starting in 2023, only ATPA will be available.

  The last administration of IFM will be in November 2022

CURRENT	NEW
VEE Economics	VEE Economics
VEE Accounting and Finance	VEE Accounting and Finance
VEE Mathematical Statistics	VEE Mathematical Statistics
Exam P – 3 hours MC*	Exam P – 3 hours MC
Exam FM – 3 hours MC	Exam FM – 3 hours MC
Exam IFM – 3 hours MC	**Exam removed**
Exam LTAM – 4.25 hours MC and WA* Exam STAM – 3.5 hours MC	Exam FAM – 3.5 hours MC Exam ALTAM or ASTAM – 2.5-3.0 hours WA
Exam SRM – 3.5 hours MC	Exam SRM – 3.5 hours MC
Exam PA – 5.25 hours WA	Exam PA – 5.25 hours WA

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Recent Changes

Component	Timing
Exam P	No change, offered every other month
Exam FM	No change, offered every other month
Exam IFM	Last administration November 2022
Exam LTAM	Last administration Spring 2022
Exam STAM	Last administration June 2022
Exam FAM	First administration October 2022 and then March, July and November each year
Exam ALTAM	First administration Spring 2023, offered twice per year
Exam ASTAM	First administration Spring 2023, offered twice per year
Exam ATPA	Open for module registration January 2022, first assessment available June 2022, offered two to three times per year
Pre-Actuarial Foundations e-Learning Module	Available January 2022
Actuarial Science Foundations e-Learning Module	Available January 2022

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Exam Registration

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Exam Registration: Step 1

- Make an account and check the exam schedule on SOA
  - Check the SOA Exam Schedule (look for the registration deadline and CBT dates)

Exam Name	CBT Dates	Paper/Pencil Dates*	Registration Deadline
Exam P, Probability	Jan. 14-25, 2022	Jan. 14, 2022	Dec. 14, 2021
	Mar. 10-21, 2022	None	Feb. 8, 2022
	May 13-24, 2022	May 13, 2022	Apr. 12, 2022
	July 15-26, 2022	None	June 14, 2022
	Sept. 15-26, 2022	Sept. 15, 2022	Aug. 16, 2022
	Nov. 11-22, 2022	None	Oct. 11, 2022

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Exam Registration: Step 1

- Exam P is offered in *ODD* months
- Exam FM is offered in *EVEN* months
- Exam IFM is offered in *March, July, November*
- Exam fees are NOT refundable
- Make sure you avoid time conflicts
  - Example: finals season
  - Recommended time for exams: July-October (over summer break)

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Exam Registration: Step 2

- Register for CBT and finish the payment to receive emails
- First email will be immediately sent after registration as **Order Confirmation**
  - This will contain:
    - Order Number
    - Candidate/Eligibility ID (needed for registration on Prometric)

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Exam Registration: Step 3

- Schedule a seat at Prometric Center *Immediately* after you receive the email and wait for the *letter of appointment confirmation*
- For more detailed information, refer to this link
- The closest Prometric Testing Center to UCLA is a 14-min drive
  - 5601 W Slauson Ave, Los Angeles, CA 90056

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Subject: Confirmation of computer-based **Probability: English, U.S./Intl,#0000000096810355**

Your appointment for the computer-based **Probability: English, U.S./Intl** is confirmed. Please find the confirmation details that follow:

Confirmation:	**0000000096810355**
Program:	**SOA/CIA**
Exam Code:	**P1EnL**
	Probability: English, U.S./Intl
Exam Date:	**13 Sep 2021**
Exam Time:	**12:00**

Prometric Test Center: **# 5863**
Los Angeles - Glendale
701 NORTH BRAND BLVD
SUITE 210
GLENDALE CALIFORNIA 91203
UNITED STATES

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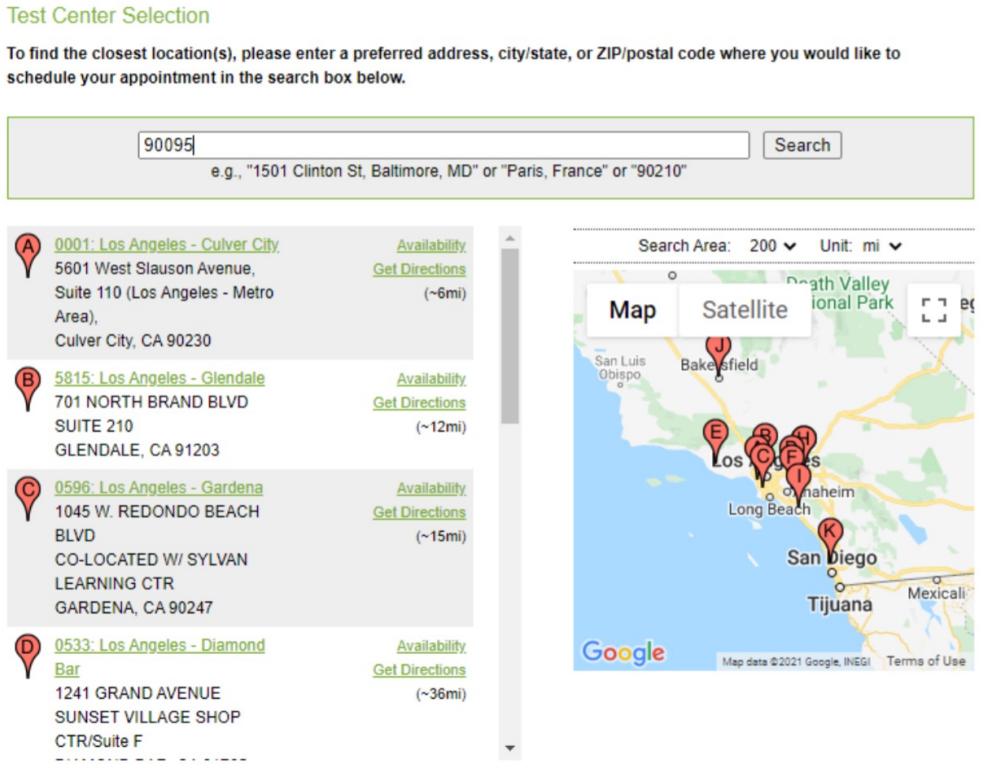
Appointment Availability

- If you go to https://www.prometric.com/soa and click on “Actions” then “Locate”, you can check the availability of exam centers before registering



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Exam Study Plan

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Corresponding UCLA Courses

SOA	CAS	Topic	UCLA Courses
Exam P	Exam 1	Probability	Math 170E
Exam FM	Exam 2	Financial Mathematics	Math 177
Exam IFM	Exam 3F	Investment and Financial Markets	Math 174E + 179

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Exam Study Plan: Self Study

- Free Resources
  - Online Study Manuals (P and FM) and Free Resources (Marcel Finan)
  - Benefits
    - Lower Cost
    - Flexibility
- Alternatives
  - ASM and ACTEX study manual (around $100-150)
  - E-Learning Courses (The Infinite Actuary or Coaching Actuaries) (less than $300 per course)
- Benefits
  - More comprehensive
  - Abundance of resources

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Exam Study Plan: Step 1

- Step 1: Learn the basic exam topics (2-3 months)
- Follow the dated syllabus for your exam found on SOA website
- Create a study schedule to learn each topic in a timely manner
- Make detailed notes on each topic with emphasis on specific formulas
- Note down difficult topics to revisit after learning the rest of the material

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Exam Study Plan: Step 2

- Step 2: Practice, Practice, and Practice!! (1-2 months)
- Do free mock test found online or practice tests from CA, TIA, etc. and sit for 3 hours each time
- Mark down incorrect questions to review after each mock test
- Note new topics encountered in mock test to go over
- Keep track of progress on mock tests and understand your goals for each attempt

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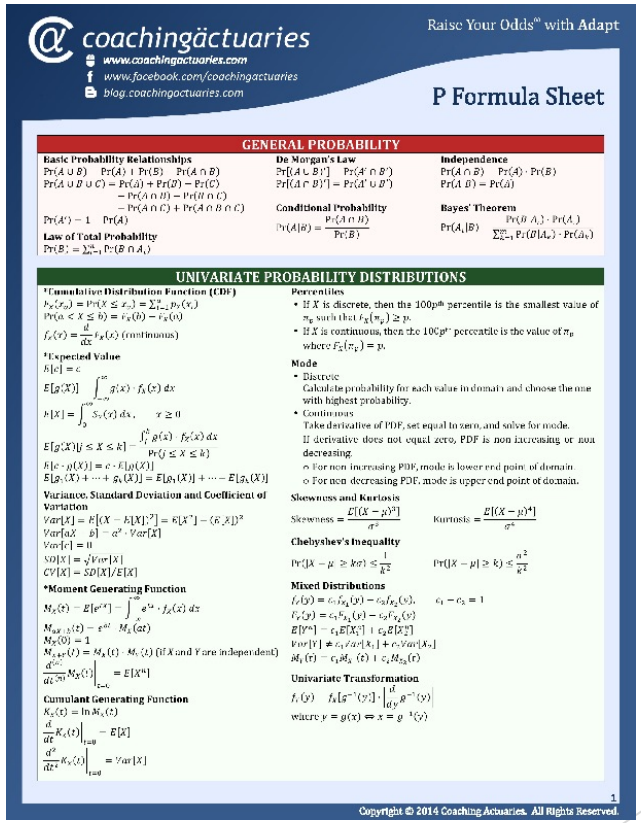
Exam Study Plan: Step 3

- Step 3: Final Review and make formula sheet (1 week)
- Create concise notes and formula sheet to review at testing site before exam
- Coaching Actuaries has free formula sheets for each exam
- Again, do a 3-hour mock exam (if possible, do it at the same time as your real exam)



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Raise Your Odds℠ with Adapt

P Formula Sheet

GENERAL PROBABILITY

Basic Probability Relationships

$\Pr(A \cup B) \quad \Pr(A) + \Pr(B) \quad \Pr(A \cap B)$

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

$\Pr(A') = 1 \quad \Pr(A)$

Law of Total Probability

$\Pr(B) = \sum_{i=1}^{n} \Pr(B \cap A_i)$

De Morgan's Law

$\Pr[(A \cup B)'] \quad \Pr(A' \cap B')$

$\Pr[(A \cap B)'] = \Pr(A' \cup B')$

Conditional Probability

$\Pr(A|B) = \frac{\Pr(A \cap B)}{\Pr(B)}$

Independence

$\Pr(A \cap B) \quad \Pr(A) \cdot \Pr(B)$

$\Pr(A \mid B) = \Pr(A)$

Bayes' Theorem

$\Pr(A_i|B) \quad \frac{\Pr(B \mid A_i) \cdot \Pr(A_i)}{\sum_{i=1}^{n} \Pr(B|A_i) \cdot \Pr(A_i)}$

UNIVARIATE PROBABILITY DISTRIBUTIONS

***Cumulative Distribution Function (CDF)**

$F_X(x_p) = \Pr(X \le x_p) = \sum_{t \le x_p} p_X(x_t)$

$\Pr(a < X \le b) = F_X(b) - F_X(a)$

$f_X(x) = \frac{d}{dx} F_X(x)$ (continuous)

***Expected Value**

$E[c] = c$

$E[g(X)] \quad \int_{-\infty}^{\infty} g(x) \cdot f_X(x)\,dx$

$E[X] = \int_0^{\infty} S_X(x)\,dx, \quad x \ge 0$

$E[g(X) \mid j \le X \le k] = \frac{\int_j^k g(x) \cdot f_X(x)\,dx}{\Pr(j \le X \le k)}$

$E[c \cdot g(X)] = c \cdot E[g(X)]$

$E[g_1(X) + \cdots + g_n(X)] = E[g_1(X)] + \cdots - E[g_n(X)]$

Variance, Standard Deviation and Coefficient of Variation

$Var[X] = E[(X - E[X])^2] = E[X^2] - (E[X])^2$

$Var[aX \quad b] = a^2 \cdot Var[X]$

$Var[c] = 0$

$SD[X] = \sqrt{Var[X]}$

$CV[X] = SD[X]/E[X]$

***Moment Generating Function**

$M_X(t) = E[e^{tX}] = \int_{-\infty}^{\infty} e^{tx} \cdot f_X(x)\,dx$

$M_{aX+b}(t) = e^{bt} \quad M_X(at)$

$M_X(0) = 1$

$M_{X+Y}(t) = M_X(t) \cdot M_Y(t)$ (if X and Y are independent)

$\frac{d^{(n)}}{dt^{(n)}} M_X(t)\Big|_{t=0} = E[X^n]$

Cumulant Generating Function

$K_X(t) = \ln M_X(t)$

$\frac{d}{dt} K_X(t)\Big|_{t=0} \quad E[X]$

$\frac{d^2}{dt^2} K_X(t)\Big|_{t=0} = Var[X]$

Percentiles

- If X is discrete, then the $100p^{th}$ percentile is the smallest value of π_p such that $F_X(\pi_p) \ge p$.
- If X is continuous, then the $100p^{th}$ percentile is the value of π_p where $F_X(\pi_p) = p$.

Mode

- Discrete
  Calculate probability for each value in domain and choose the one with highest probability.
- Continuous
  Take derivative of PDF, set equal to zero, and solve for mode.
  If derivative does not equal zero, PDF is non increasing or non decreasing.
  - For non increasing PDF, mode is lower end point of domain.
  - For non decreasing PDF, mode is upper end point of domain.

Skewness and Kurtosis

$\text{Skewness} = \frac{E[(X-\mu)^3]}{\sigma^3}$ $\quad$ $\text{Kurtosis} = \frac{E[(X-\mu)^4]}{\sigma^4}$

Chebyshev's Inequality

$\Pr(|X - \mu| \ge k\sigma) \le \frac{1}{k^2}$ $\quad$ $\Pr(|X - \mu| \ge k) \le \frac{\sigma^2}{k^2}$

Mixed Distributions

$f_Y(y) = c_1 f_{X_1}(y) + c_2 f_{X_2}(y), \quad c_1 + c_2 = 1$

$F_Y(y) = c_1 F_{X_1}(y) + c_2 F_{X_2}(y)$

$E[Y^n] = c_1 E[X_1^n] + c_2 E[X_2^n]$

$Var[Y] \ne c_1 Var[X_1] + c_2 Var[X_2]$

$M_Y(t) = c_1 M_{X_1}(t) + c_2 M_{X_2}(t)$

Univariate Transformation

$f_Y(y) \quad f_X[g^{-1}(y)] \cdot \left| \frac{d}{dy} g^{-1}(y) \right|$

where $y = g(x) \Leftrightarrow x = g^{-1}(y)$

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What to Know About Exam Day

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Exam Day

- Get enough sleep the night before the exam day
- What the test center provides:
  - Pencils (ask for more)
  - Ear plugs
  - Scratch paper
- What you should bring:
  - Approved calculator (check SOA website or at the end of 3rd email) – can bring multiple calculators
    - Valid non-expired government-issued ID with a photo & signature
    - Short notes, snacks, jacket

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Exam Day

- Arrive at the test center 30 minutes before the exam
- Follow Covid Protocols
  - DO NOT FORGET A MASK
- Tentative pass/fail results will be given right after the exam (never wrong)
- Official test scores will be confirmed after approximately 8 weeks
- Check SOA website for:
- Passing candidate names/numbers/percentages
- Online transcript

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