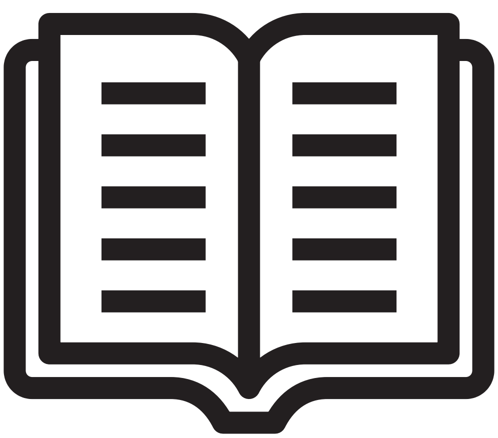
ACTEX Learning

GI 201
Operational, Financial, Regulatory and Legal
Study Manual

1st Edition

Yanlin Shi, PhD FSA FIAA CERA CStat FHEA



An SOA Exam

ACTEX Learning

Learn Today. Lead Tomorrow.

Actuarial & Financial Risk Resource Materials

Since 1972

Printed in the United States of America.

ACTEX Learning

Who We Are

A Benefit Corporation Experienced at Teaching Actuaries!

Experienced

More than 50 years experience in helping students prepare and pass actuarial exams!
We are an eLearning technology and education company leveraging experts in the field to constantly update our learning content in a format that works for you.

Trustworthy

ACTEX Learning is a leading US based provider of study materials for actuarial exams
Our authors and content contributors are renowned academics and Actuaries that are proud to have their names in the cover of our manuals and textbooks!

Mission Focused

We are a Benefit Corporation focusing on the mission of Accessible High Quality Actuarial Education.
We're dedicated to empowering actuarial students by offering test prep materials that are not just effective and efficient but also tailored to suit every type of student.

Become an ACTEX Champion

The ACTEX Champion Program is designed specifically for clubs and organizations with students taking actuarial exams and working toward becoming actuaries. With this partnership, your club/organization will have access to discounts of top quality study materials and community support. We will work with you and your club, sharing study insights, exam taking strategies and much more.

Mission Focused

We are exceptionally proud to be legally registered as a Benefit Corporation. Our Benefit Corp mission is to expand global access to affordable actuarial education. Our mission is central to our daily work and defines ACTEX's unique business model.

ACTEX as a Benefit Corporation

As a registered Benefit Corporation, we don't use our sales and operations to pursue increased profits. Instead, we reinvest our earnings to enrich the student learning experience, expand educational access through improved affordability and improve how we meet the needs of our entire family of stakeholders. When you choose to purchase from ACTEX, you are also benefitting your academic and professional communities.

We are leaders in a growing global movement – using business as a force for good.

- We commit ourselves to the creation of, and broad access to affordable, comprehensive, innovative, and customizable educational resources that help students learn and professors teach.
- We weigh the impact of our decisions on all of our other stakeholders too; our employees, authors and instructors, vendors, professional societies, local communities and the environment.
- We strive to meet the highest standards of overall social and environmental performance, transparency, and accountability.
- In short, we are dedicated to making the academic, professional, and other communities that we serve, a better place for everyone.

Free Resources!

Part of our mission as a benefit corp is opening doors for aspring actuaries around the world. Scan the QR codes below to recieve access to exam formula sheets or career and study guides. All resources are completely free and just one way we've chosen to give back.

Formula Sheets

Actuarial Exam Tactics

The Actuarial Career: Getting Started

Contents

NOTES

This study manual is written with the purpose of assisting the candidates for the SOA exam GI 201 Operational, Financial, Regulatory and Legal. In most cases, the readings covered in this manual is in the order as they appear in the syllabus.

Relevant practice questions and answers are provided at the end of each reading. Past exam and answers have been taken from SOA's GIFREU (**up to 2020 spring, and relevant question numbers for 2020 fall, 2021 spring/fall and 2022 spring/fall**), which are identified with "(SOA GIFREU Year Spring/Fall Qi)" in the manual. When there is insufficient exercise, past exams and answers of the CAS exam 6US are included. All the past exam questions and answers are copyrighted by the Society of Actuaries and Casualty Actuarial Society. I appreciate the SOA for its permission to use this material. The SOA, however, is in no way responsible for the structure or accuracy of the manual. SOA will publish relevant past exam questions in July 2025, and the mapping for 2023–2025 exams are therefore excluded. Note that for some readings, especially chapters of the SOA textbook *General Insurance Financial Reporting Topics* (GIFRT), past exam questions may cover syllabus of both GI201 and GI302. To maintain the completeness of the questions, they are included in the manual. Readers should be aware that some may be out of the scope of GI201.

The last part consists an original practice exam, with questions based on the required study materials. Many of those questions are inspired by the past SOA GIFREU and CAS exam 6US. Although I have made a conscientious effort to eliminate mistakes in questions and answers, errors may exist. I encourage candidates who find errors to bring them to my attention. You can send your comments to my email address - syl9810@gmail.com. Any other feedback is also warmly welcome.

As a final suggestion, practice is important! Among all the reasons for failures, not taking past exams seriously is the No.1 issue. In addition to my mock exam, candidates are strongly encouraged to at least attempt the relevant past year questions published officially by the SOA to achieve the maximum likelihood of passing.

I would like to thank Stephen Camilli, FSA and the former President of ACTEX Learning, for his insightful comments.

Best of luck with your studies!!!

This page is intentionally left blank.

Part I

General Insurance Company Operations

Solutions to practice questions

1. - Core: Production (sales/marketing), Pricing (ratemaking), Underwriting (risk selection), Claims (handling).
   - Supporting: Accounting & Finance, IT, Investments, Legal, Reinsurance, Risk Management—each ensures smooth operation, compliance and financial stability.
2. - Admitted: state-licensed, must file rates/forms, serve standard market—use agents and brokers.
   - Nonadmitted: surplus lines, can write unusual risks without state-filed forms—placed by surplus lines brokers.
3. - Loss component: expected loss costs including allocated LAE.
   - Expense loading: ULAE, acquisition, admin expenses, taxes/fees.
   - Profit margin: contingency for profit and capital cost.
   - Reinsurance loading: cost of ceded reinsurance layers.
   - Adjust for competitive positioning and regulatory requirements.
4. - Combined ratio = loss ratio + expense ratio; measures underwriting profitability.
   - Operating ratio = combined ratio - investment income ratio; includes investment returns.
5. - Ceded % = 30%, thus reinsurer pays $0.30 \times \$200\,000 = \$60\,000$.
   - Primary insurer retains $140 000.
6. - Detecting and deterring insurance fraud.
   - Obtaining updated information for renewal underwriting.

Chapter 2

FGIAA Chapter 29 Manual Rating

Syllabus

1d) Understand the process for pricing general insurance policies.

§2a Introduction

- Two important equations:
  - Premiums = claims + expenses + profit and contingencies
  - Premiums = exposures × base rate adjusted by rating factors × adjustment for individual risk rating

§2b Manual Rating

- Manual premium = exposures × base rate adjusted by rating factors
- Base rate reflects the average experience

§2c The Rating Manual

- Contains the assignment of a base rate
- Contains three major categories:
  - Rating rules
  - Rating algorithms
  - Rate pages

§2d Rating Rules

- The base rate:
  - Refers to a unit of cost that will be multiplied by exposure to determine a base premium
  - Represents the average cost (claims, expenses, profit and contingencies) of coverage
  - Is calculated at a specified deductible and policy limit
- The rating factors:

  - Reflect the risk characteristics that are relevant to the specific line of business
- The rating rules:
  - Represent the specific characteristics of
    - the insurance coverage, and
    - the exposure base used for determining premiums

§2e Rating Algorithm

- The rating algorithm refers to the formula to determine the premium
- May also address loadings to premiums

§2f Rate Pages

- Summarize the base rate(s) and rating factors
- May also contain discounts and surcharges

Practice questions

1. Name the three major categories of the rating manual.
2. State the two important equations for premium calculation.
3. What information do rate pages summarize, and what additional elements may they include?

Solutions to practice questions

1. The three major categories are:
   - Rating rules
   - Rating algorithms
   - Rate pages
2. The two important equations are:
   - Premiums = claims + expenses + profit and contingencies
   - Premiums = exposures $\times$ base rate adjusted by rating factors $\times$ adjustment for individual risk rating
3. Rate pages summarize the base rate(s) and rating factors; they may also contain discounts and surcharges.

Part IV

Financial Economics

Chapter 20

Behavioral Finance

Syllabus

4a) Demonstrate knowledge of behavioral finance

§20a Introduction

- Definition. Behavioral finance studies how real-world psychological biases and market frictions cause deviations from the predictions of classical, fully rational, efficient-market models.
- Two building blocks
  - *Cognitive psychology* – systematic errors in how individuals perceive, process, and use information.
  - *Limits to arbitrage* – practical frictions that stop rational traders from eliminating mispricing.
- Motivation. Traditional finance struggles to explain bubbles such as Japan (late-1980s), Taiwan (1989–90), or the US dot-com boom (1998–2000). Behavioral models help fill this gap.
- Contrast with EMH. The Efficient-Markets Hypothesis allows some investors to be irrational but assumes prices remain unbiased. Behavioral finance relaxes this market-level rationality in selected settings.
- Mispricing categories.
  - *High-frequency, short-lived* – small, often arbitraged away (e.g., bid–ask bounce).
  - *Low-frequency, persistent* – large, long-lasting (e.g., multi-year bubbles) because arbitrage is risky, costly, or impossible.

§20b Cognitive Biases

§20b(i) Heuristics

- Rules of thumb simplify complex decisions but misfire if the environment changes.
- Example: the $1/N$ retirement rule – equal allocation across available funds regardless of true risk profile.

§20b(ii) Overconfidence

- Investors systematically overestimate their forecasting skill and the precision of private information.

- Symptoms
  - Excessive trading (higher turnover, lower net returns).
  - Home, industry, and employer-stock biases leading to poor diversification.
  - Gender effect – empirical evidence shows men trade more and underperform women on average.

§20b(iii) Mental Accounting

- People compartmentalise wealth into separate "accounts" rather than treating it holistically.
- Leads to inconsistent choices: e.g. splurging on restaurant meals while scrimping on groceries, or simultaneously holding high-interest credit-card debt and low-yield savings.

§20b(iv) Framing

- Identical outcomes are valued differently depending on wording or context.
- Example: consumers prefer an "early-bird discount" to an identical "peak-time surcharge."
- Policy illustration – presenting insurance as a "small premium to avoid a large loss" increases take-up.

§20b(v) Representativeness

- Investors overweight recent or salient information and underweight long-term base rates ("law of small numbers").
- Drives momentum in bull markets and excessive pessimism after crashes.

§20b(vi) Conservatism

- Opposite of representativeness – slow adjustment to genuine regime shifts because of anchoring on prior beliefs.
- Explains post-earnings-announcement drift: investors underreact to new information, prices adjust gradually.

§20b(vii) Disposition Effect

- Tendency to realise gains quickly and ride losses too long.
- Produces lower trading volume in bear markets as investors defer loss realisation, raising systemic liquidity risk for brokers.

§20c Limits to Arbitrage

- Implementation costs. Short-sale constraints, margin requirements, and transaction fees deter traders from correcting mispricing.
- Model risk. Mispricing may widen before converging, bankrupting the arbitrageur (e.g. Long-Term Capital Management's Royal Dutch/Shell trade).
- Noise-trader risk. Mispricing generated by irrational traders can persist or intensify unpredictably; rational traders with finite capital cannot bear interim losses indefinitely.
- Funding risk. Capital withdrawals by clients after poor short-run performance force arbitrageurs to liquidate just when opportunities are best (feedback loop that amplifies bubbles).
- Practical categorisation.

- *Recurrent, short-horizon mispricing.* Hedge funds compete away profits; markets appear efficient.
- *Long-horizon, nonrepeating mispricing.* High uncertainty and funding risk render arbitrage ineffective; large bubbles or crashes emerge.

Practice questions

1. Explain how overconfidence affects portfolio diversification and trading volume.
2. Describe the disposition effect and discuss its implications for brokers' revenue over the market cycle.
3. Identify two key limits to arbitrage and illustrate each with an historical example.

Solutions to practice questions

1. - Overconfident investors overestimate their stock-picking skill and the precision of private signals.
   - They trade more frequently, incurring higher transaction costs and taxes.
   - They hold concentrated positions in familiar or employer stocks, reducing diversification and risk-adjusted returns.
2. - Disposition effect – investors prefer to lock in gains quickly (realising small profits) and defer sales of losing positions.
   - In bull markets: many winners are realised, boosting trading volume and commission income.
   - In bear markets: investors “wait to break even,” volume and brokerage revenue fall sharply.
3. - Short-sale constraints. Difficulty and cost of borrowing shares limited arbitrage against tech stocks during the 1999–2000 bubble.
   - Funding (liquidity) risk. Long-Term Capital Management’s Royal Dutch/Shell convergence trade (1998): investor redemptions forced liquidation as mispricing widened, amplifying the divergence.

This page is intentionally left blank.

Chapter 41

Practice Exam

Note to Candidates: This practice exam follows the format of the past GIFREU exams. The total mark is 50 points, which reflects the new SOA requirement that the contents would be two hours and a half, although the permitted time is three hours. Some questions are inspired by past exams of CAS exam 6US and SOA GIFREU.

When you take the exam, stick to the time limit (three hours) and simulate exam conditions. It is recommended that you spend three minutes for each point. At the end of the recommended time, you should stop answering and move to the next question.

Questions

1. (3 points) Answer the following questions.

   (a) (1 point) Define Allocated Loss Adjustment Expenses and Unallocated Loss Adjustment Expenses.

   (b) (1 point) An insurer has the following data for the year:

   - Losses + LAE incurred: $80,000
   - Earned premium: $200,000
   - Underwriting expenses incurred: $50,000
   - Written premium: $250,000
   - Investment income on insurance funds: $20,000

   Calculate:

   (i) The Combined Ratio

   (ii) The Operating Ratio

   (c) (1 point) Describe two core functions of an insurance company.

2. (7 points) One of the typical government provision in the insurance industry is agriculture insurance.

   (a) (2 points) Briefly describe four types of agriculture insurance.

   Recently, agricultural risks to be insured against have evolved significantly.

   (b) (1.5 points) Identify three significant changes affecting agricultural risks.

   Canada has an agricultural insurance system with shared responsibility between federal and provincial governments.

   (c) (2 points) Explain four types of Canadian government provisions in the agricultural insurance.

Another important line of business that needs government provision is the health insurance. After the introduction of the Affordable Care Act (ACA) in the US, various tax measures beyond the tax penalty are resulted for the public without health insurance coverage.

(d) (1.5 points) List three examples of those tax measures.

3. (3 points) An insurer has the following cash-flow profile and uses a flat yield curve of 10

   - Assets: \$1 000 paid at the end of years 1, 2 and 3.
   - Liabilities: \$1 500 paid at the end of year 1 and \$1 000 paid at the end of year 2.

   (a) (1 point) Calculate the Market Value of Assets and the Market Value of Liabilities.

   (b) (1 point) Compute the asset duration and the liability duration .

   (c) (1 point) Calculate the duration gap of surplus and state the approximate percentage change in surplus if yields rise by 1%.

4. (3 points) Actuaries often tailor their work using a set of flexibility tools rather than applying a one-size-fits-all approach.

   (a) (1 point) List the four flexibility tools commonly used by actuaries to adjust their level of analysis.

   (b) (1 point) In the context of Solvency II, explain what is meant by proportionality in actuarial work.

   (c) (1 point) Describe how cos-benefit analysis guides an actuary's decision on the scope of work to perform.

5. (4 points) One of the benefits of creating a captive insurer is that it is subject to less regulation than a traditional insurance company.

   (a) (1.5 points) Explain three ways that captive insurers are subject to less regulation than traditional insurance companies. There are also several drawbacks to creating a captive insurer

   (b) (1.5 points) Describe three drawbacks. Various different types of captive insurers have been created.

   (c) (1 point) Define the following types of captive insurers:

   (i) Diversified

   (ii) Agency-owned

6. (5 points) Answer the following questions:

   (a) (1 point) Explain what is meant by the application of strict liability in a tort case.

   (b) (4 points) Assess the potential for the application of strict liability for each of the following cases:

   (i) ABC Toys manufactures a popular line of stuffed bears with moveable limbs. The limbs of these toys employ the use of thin metal parts. Failure of these parts may cause sharp pieces to break off. This occurred after a small child was chewing on the stuffed bear's arm and one of the sharp pieces caused serious injury to the child. The parents of the child are suing ABC Toys for damages.

   (ii) The Clark family stores large quantities of chemicals to clean their pool. They have taken reasonable care to ensure the chemicals are stored safely. A lightning strike caused the storage container for these chemicals to fail. The chemicals spilled into the property of their neighbor, the Griswald family. The Griswald family sues the Clark family for damages to their property.

   (iii) The Alpha family has a small dog which escaped from their yard by digging under the fence. The dog went over to the Beta family's property and chewed all four tires on their vehicle. This was the first time the dog had done anything like this. The Beta family sues the Alpha family for damages.

   (iv) Beeline Accounting prepares the financial statements for a small business, Baubles, that sells handmade jewelry. A significant error was made in the financial statements which caused Baubles to pay a large tax penalty. Baubles sues Beeline for damages.