
CAS Exam 9 – Financial Risk and Rate of Return
Fall 2011 to Present
Exam Preparation Comments



CAS Exam 9

ALL 10 – Company Direction and Initial Comments

November 2018

Writing a report like this one has been on my “to do list” for quite some time. But as many of us experience daily, there is always too much to do and not enough time to do it in.

Hopefully, you will find my comments relevant, my suggestions on how to best prepare insightful, and recommendations to achieve a passing score very much attainable.

ALL 10 – Preparation Materials for CAS Exams 5, 6 and 9 Moving Forward

For the past 18+ years, ALL 10 has produced study materials for candidates preparing for the upper level CAS Exams. It has been challenging to say the least, given the number of changes the CAS has made to the syllabus over time, especially with its re-write in 2011, the adoption of the two text books for Exam 5, the CAS Financial Reporting text for Exam 6, and the numerous re-writes to the syllabus for Exams 7 – 9.

In light of the above, we assessed where our resources can be best utilized, and have chosen to focus our efforts solely on Exams 5, 6 and 9.

By doing so, we will re-direct our efforts to producing additional exam relevant study aids to the above referenced exams.

Questions

If you are planning to sit for Exam 9 in the Spring of 2019, you undoubtedly have questions on how best to prepare.

It is my hope that many of the questions you may have are either answered in this report or in our Study Program Excerpts report, located online next to this report.

However, if you have specific questions that are not addressed in this document, please contact us via email at support@all10.com.

We promptly reply to all inquiries.

Also if you have ideas for study aids that are not available but would be beneficial for exam preparation, let us know since other candidates may have the same need.

Start slowly, build momentum over time, and celebrate often the goals you achieve during your exam preparation period.

Thank you for your patronage over the years, and best wishes in preparing for Spring 2019 Exam 9.

Rich Zarnik, ACAS
ALL 10, Inc. Owner

CAS Exam 9 – Fall 2011 to Present

Overview

CAS 9 Statistics – 2011 to Present

Let's begin by reviewing some key statistics associated with the exam since Spring 2011:

| Exam | Number of Candidates * | # of Passing Candidates | Total Points | Pass Mark | Pass Mark As a % of Pts | Effective Pass Ratio | Total Questions | Avg Pts per Question |
|---|------------------------|-------------------------|--------------|-----------|-------------------------|----------------------|-----------------|----------------------|
| Spring 18 | 577 | 312 | 60.50 | 43.25 | 71.5% | 54.1% | 21 | 2.88 |
| Spring 17 | 503 | 290 | 60.00 | 43.75 | 72.9% | 57.7% | 27 | 2.22 |
| Spring 16 | 504 | 254 | 62.50 | 44.00 | 70.4% | 50.4% | 29 | 2.16 |
| Spring 15 | 441 | 185 | 58.75 | 40.75 | 69.4% | 42.0% | 27 | 2.18 |
| Spring 14 | 401 | 201 | 53.50 | 38.25 | 71.5% | 50.1% | 24 | 2.23 |
| Spring 13 | 535 | 219 | 52.50 | 37.00 | 70.5% | 40.9% | 25 | 2.10 |
| Spring 12 | 731 | 327 | 54.50 | 34.50 | 63.3% | 44.7% | 18 | 3.03 |
| Spring 11 | 907 | 354 | 46.75 | 33.50 | 71.7% | 39.0% | 21 | 2.23 |
| * Excluding Candidates below 50% of the Pass Mark | | | | | | | 192 | |

In general, the number of candidates and passing candidates, total points, pass mark, and effective pass ratios (with the exception of the Spring 2015 exam) have been increasing.

What stands out is the dramatic shift in fewer questions and higher average points per question on the Spring 2018 exam. This of course is in line with the CAS' 2017 adoption of an integrative testing framework.

Based on statements made by the CAS as mentioned below, and a review of the Integrative Questions (IQs) examined to date, high point, IQs pose the greatest challenge for candidates preparing for CAS Exam 9.

Recent Changes to the Exam 9 Syllabus

In August 2016, the CAS announced major changes to its Spring 2017 CAS Exam 9 syllabus.

- Seven readings which had been on the syllabus for years were removed entirely.
- Minor changes were made to the BKM text and UPP Robbin readings.
- Three new readings were added.

From a study materials provider point of view, this presented a huge challenge to dismantle and reconstruct a series of new study materials in a short period of time so that candidates could begin their preparation for the Spring 2017 CAS Exam 9 starting in late 2016.

Further, the CAS announced at that time that it "is gradually moving towards an integrative testing framework. Integrative Questions (IQs) will require candidates to understand multiple facets of the syllabus material and concepts in addressing complex business problems in a single exam question.

IQs will differ from a typical exam question in three significant ways.

1. An IQ will be worth more points. One IQ could be worth 10-15% of the total exam.
2. Each IQ will require candidates to draw from multiple syllabus learning objectives in order to answer the question.
3. IQs will test at a higher average Bloom's Taxonomy level than a standard exam question."

CAS Exam 9 – Fall 2011 to Present

Overview

CAS Examiner's Report

CAS Examiner's, in their Spring 2017 and 2018 Report, remind candidates preparing for this exam of the following:

- i. "Candidates should note that the instructions to the exam explicitly say to show all work; graders expect to see enough support on the candidate's answer sheet to follow the calculations performed."
- ii. "Candidates should justify all selections when prompted to do so."
- iii. Candidates should try to be cognizant of the way an exam question is worded. They must look for key words such as "briefly" or "fully" within the problem.
- iv. "Some candidates provided lengthy responses to a "briefly describe" question, which does not provide extra credit and only takes up additional time during the exam."
- v. "Candidates should be cautious of relying solely on study manuals, as some candidates lost credit for failing to provide basic insights that were contained in the syllabus readings."
- vi. "It should be noted that all exam questions have been written and graded based on information included in materials that have been directly referenced in the official syllabus, which is located on the CAS website. The CAS takes no responsibility for the content of supplementary study materials and/or manuals produced by outside corporations and/or individuals which are not directly referenced in the official syllabus."

"My Why"

To prepare candidates for this exam, I chose to develop a study program with four main goals:

1. Create article summaries based solely on the content of the actual reading. This was done by first conducting a "page" by "page" review of the syllabus readings, summarizing the most salient content that aligned with the CAS LO and KS, and disregarding any superfluous material in the readings during the summarization process.
2. Provide robust solutions to past CAS computational questions. CAS solutions can be vague, lacking in detail, and difficult to follow at times. ¹
3. Assemble a bank of questions and solutions to review during the final weeks leading to the Spring Exam.
4. Develop a "Final Review Guide". This guide contains key content, concepts, topics, and formulas tested and testable, as your "go to" documents during your final review.

¹ It's important to mention that it is not the purpose nor the objective of CAS examiners to provide robust solutions to past CAS questions, but rather to provide sample answers of the most common correct responses.

CAS Exam 9

ALL 10 Study Program

4 Main Goals in developing our Online Review Course:

I. Create article summaries based solely on the content of the actual reading.

Many past and present providers of CAS Exam 9 Study Materials provide summaries of the content found in the actual syllabus readings “in their own words”. If I were a candidate preparing for the exam, I’d find this beneficial since the syllabus readings are extremely wordy and filled with extraneous information.

However, the approach our company has taken to develop our study materials is radically different.

As noted by Examiner’s on the previous page, “all exam questions have been written and graded based on information included in materials that have been directly referenced in the official syllabus”. That is exactly why the source of our summarizations is the content within the actual syllabus readings.

To view how we summarize each and every syllabus reading page, go to <http://www.all10.com/exam-6/> and click on the icon “Using the Study Aids”. The same summarization process was used in developing the Exam 9 study manuals.

Two other key criteria we used in developing the manuals are as follows:

1. Produce summaries that reduce the syllabus reading material to no more than 60% of the original content.

There are approximately 850 total syllabus reading pages, of which our article summaries comprise 478 pages which reduces the syllabus readings to less than 57%.

The remaining study manual pages, approximately 672`, represent past CAS questions and solutions. Thus, about 58 % of the manual is focused on categorizing past CAS questions by topic and presenting comprehensive solutions.

2. Include charts, graphs, tables, etc. in the summaries to reinforce key concepts discussed in the readings. For example, for any syllabus reading that has a table, that table is inter-mixed with our summaries of that article.

In light of the above, we believe our summarization process aligns well with CAS Examiner’s comments on study manuals to contain content that directly reflects the official syllabus readings.

CAS Exam 9

ALL 10 Study Program

4 Main Goals in developing our Online Review Course:

II. Provide robust solutions to Past CAS computational questions

In our opinion, there are no better practice questions to work to best prepare for the actual exam than past CAS questions.

Why?

First, as stated by the CAS, the questions are developed by a team that typically includes new Fellows, who are placed on an exam that best fits the skill sets of the question writer. A three year commitment is requested by the Exam committee to maintain quality and consistency in the development of the exam.

After submitting questions, the entire committee meets for two days to refine the questions and assemble the exam. This process results in a set of questions that most candidates find challenging, as evidenced by the numerous posts in the actuarial outpost right after an exam is administered.

Second, exam 9 now has a critical mass of past CAS questions and solutions for candidates to review.

With the administration of Spring 2018 exam, there are approximately 150 questions (which excludes questions no longer relevant due to syllabus changes) available for candidates to work since the release of the Spring 2011 Exam.

Unfortunately, solutions to computational questions provided by the CAS are not always intuitive². In fact, it takes a great deal of time to review a number of past CAS solutions in an effort to understand the nuances in the solution process.

To that end, many of our solutions offer unique elements to overcome these shortcomings, including:

1. **Initial comments.** To assist candidates in formulating an overall approach to solve a given question, we provide key excerpts from the syllabus readings to initiate your thought process on how to frame your solution. As an example, see our initial comments in our solutions to question 32 from the 2008 exam from the Managing Interest Rate Risk article by Panning, in our Study Program Excerpts Report. The Excerpts report is located next to this document on the website.

Formulating a clear path to problem solving is the biggest stumbling block for candidates when attempting to solve questions with high point values. By providing a framework on how to problem solve, one can employ a step by step process in arriving at the final answer.

2. **Step by Step solution processes** in both summarized and detail formats.

In many of our solutions, we suggest that candidates write several equations down first, before solving a problem, to assist in developing a step by step problem solving process.

Rather than describe the process, see our solution to question 24 from the 2010 exam from the Managing Interest Rate Risk article by Panning, found in our Study Program Excerpts Report, as an example.

Our approach to computational problem solving is instructional. It is not meant to be replicated on the exam as it would require too much time to reproduce in its entirety. However, candidates that adopt a blended problem solving process that streamlines our approach with their current problem solving methods can provide Examiner's with what they seek; that being "enough support on the candidate's answer sheet to follow the calculations performed."

² Again it's important to mention that it is not the purpose or objective of CAS examiners to provide robust solutions to past CAS questions, but rather to provide sample answers of the most common correct responses.

CAS Exam 9

ALL 10 Study Program

4 Main Goals in developing our Online Review Course:

II. Provide robust solutions to Past CAS computational questions

Syllabus Readings and Past CAS questions

Shown below are the syllabus readings listed by the date they were added to a previous CAS syllabus.

Of the 25 readings below, all but three have been on the syllabus for quite sometime, with the understanding that:

- Chapter 14 from the BKM text was on the CAS syllabus from approximately 2003 – 2009 and
- Chapter 23.4 on Swaps covers a great deal of the material that was discussed in the Hull text, which was previously on the Old CAS Exam 8 syllabus.

We reviewed all past CAS questions from BKM 14 and Hull, and if still applicable to the current LO and KS, they have been incorporated into the study manuals.

| Added To Syllabus | Syllabus Reading | Author | Notes |
|-------------------|---|------------------|---------------------------------|
| 1992 | The Relationship of Underwriting, Investment, Leverage, and Exposure to Total Return on Owners Equity | Ferrari, J.R. | |
| 1992 | The Underwriting Profit Provision Excluding Sections V, VI, and IX | Robbin, Ira | |
| 1992 | Pricing Insurance Policies: The Internal Rate of Return Model | Feldblum, S. | |
| 1994 | Solvency Measurement for Property-Liability Risk-Based Capital Applications | Butsic, R.P. | |
| 2000 | Investments: Chapter 16 | BKM | |
| 2001 | Insurance Profitability | McClenahan, C.L. | |
| 2002 | Investments: Chapter 6 | BKM | |
| 2002 | Investments: Chapter 8 | BKM | |
| 2003 | Investments: Chapter 7 | BKM | |
| 2003 | Investments: Chapter 9 | BKM | |
| 2003 | Investments: Chapter 10 | BKM | |
| 2003 | Investments: Chapter 11 | BKM | |
| 2003 | Investments: Chapter 12 | BKM | |
| 2003 | Investments: Chapter 15 | BKM | |
| 2004 | An Application of Game Theory: Property Catastrophe Risk Load | Mango | |
| 2005 | Allocation of Capital in the Insurance Industry | Cummins, J. D | |
| 2007 | Risk Adjusted Performance Measurement for P&C Insurers | Goldfarb | |
| 2007 | Managing Interest Rate Risk: ALM, Franchise Value, and Strategy | Panning | |
| 2009 | CAT Bond and Other Risk-Linked Securities | Cummins, J. D | |
| 2011 | The Economics of Structured Finance | Coyal, et al | |
| 2017 | Investments: Chapter 14 | BKM | Was on from 2003-2009 |
| 2017 | Capital Allocation by Percentile Layer | Bodoff | |
| 2017 | IRR, ROE, and PVI/PVE | Robbin | |
| 2017 | Riskiness Leverage Models | Kreps | |
| 2017 | Chapter 23.4 Swaps | BKM | Contains content from Hull Text |

Given the number of years that the vast majority of the syllabus readings have been on a previous CAS syllabus, candidates have access to a fair number of past CAS questions to review.

Of course, having access to more questions is preferable, so we have developed quite a few of our own, found in our Volume 3: Preparatory Tests and in our e-Review Tests.

See page 9 of this report and download our Study Program Excerpts for more information.

CAS Exam 9

ALL 10 Study Program

Preparing for IQs

As you read through the make up of the CAS IQs (see below), you will learn that a great deal of IQ questions are drawn from the content of the BKM text. Therefore, we strongly advise you to purchase the text book and its solution manual.

BKM Textbook Questions and Solutions

The BKM text has a large number end-of-chapter questions, many of which have been used to frame questions that have appeared on past CAS Exams. I recommend that you buy the book, work a fair number of the more challenging questions (e.g. the CFA questions) and check your answers to those in the solutions manual.

Google Bodie, Z.; Kane, A.; and Marcus, A.J., Investments, 10th Edition and solutions manual to find online bookstores that have them for sale.

Note: Per the CAS "An 11th edition of Investments by Bodie, Z.; Kane, A.; and Marcus, A.J is available. References will be updated for this new edition, but the 10th edition will remain as a valid text reference"

CAS Exam 9 Integrative Questions (IQs) - Samples

The CAS has published three sample IQ questions.

Question 1, worth 6 points, draws from concepts discussed in various chapters from BKM and the Goldfarb text.

Question 2, worth 7 points, draws from concepts discussed in various chapters from BKM.

Question 3, worth 7.25 points, draws from concepts discussed in the BKM, Bodoff, Goldfarb, Panning and McClenahan texts.

CAS Exam 9 IQs - Tested

An overview of actual CAS IQ questions from the Spring 2017 and Spring 2018 follows:

CAS question 1 from the Spring 2017 exam, worth 7.5 points, tests content related to the following Learning Objectives: Part a: D1, Part b: C6, C8, Part c: B4, Part d: C9, Part e: A9

CAS question 1 from the Spring 2018 exam, worth 11 points, tests content related to the following Learning Objectives: A1, A2, A3, A5, A6, A7, A9

CAS question 2 from the Spring 2018 exam, worth 7.25 points, tests content related to the following Learning Objectives: A6, B2, B4, D1, D2, D3, D5.

These IQs typically have 4 to 5 subpart questions (e.g. part a., part b., ...part e.), with each sub-part being worth approximately 1 to 4 points. When preparing for these questions during your first pass through them, it is advisable to look at each of the sub part questions in isolation, and then formulate an approach to solving them. Otherwise, looking at them in their entirety can be overwhelming.

The manual contains a section dedicated to the 3 CAS Sample IQ questions and the 3 past CAS exam questions from the Spring 2017 and 2018 Exams.

We have spent a fair amount of time developing a more robust set of solutions to these questions than those that can be found on the CAS website. Incorporated into those solutions are suggestions on how to frame an approach to solving such questions in an effort to prepare you for solving IQs on the exam.

CAS Exam 9

ALL 10 Study Program

Preparing for IQs

If this is your first time taking the exam, we recommend working these problems toward the end of your exam preparation period of study. If you have sat for the exam before, start reviewing your notes to identify where potential IQ questions can be drawn from, using the above observations as a guideline.

Finally, on the Spring exam, work these problems either at the beginning of the exam, when your mind is fresh, or during the final hour of the exam, since at that point you will be in "exam mode", and used to the rigor of grinding out answers.

CAS Exam 9

ALL 10 – Study Program

4 Main Goals in developing our Online Review Course:

III. Assemble a bank of questions and solutions for final review

Additional Practice Tests and Exams

We provide two types:

1. Preparatory Tests (Syllabus Section Based) and Practice Exams

110 CAS Exam Style Type Questions and Solutions

2. e-Review tests – 5 Tests (Syllabus Section Based)

80 questions in total – 15 to 18 questions per test

Sample questions associated with the three added syllabus readings in 2017 (Bodoff - "Capital Allocation by Percentile Layer," Kreps - "Riskiness Leverage Ratios," and Robbin, I – "IRR, ROE, and PVI/PVE") are found in these tests, as opposed to being located at the end of the article summary.

Practice Tests and Practice Exams

A. Practice Tests

1. Practice tests comprise a larger number of questions from a smaller number of readings than you would see on an actual exam. This is exactly what candidates need; more questions to work on from a smaller number of readings to get a better idea of what you know and what you need to work on.

Comparing your answers to our solutions should give you a good idea of what you know and what topics you may want to spend further time reviewing prior to sitting for the actual exam.

2. In our opinion, our solutions would be deemed sufficient and acceptable by Examiners. However, these solutions would not be the only acceptable ones.

B. Practice Exams differ from Practice Tests in two main ways:

1. They include questions from all Syllabus Sections which is more representative of actual CAS Exams.
2. The questions tend to be more difficult than those in the Practice Tests, and thus require more time to complete.

C. e-Review Tests

We structured the tests as syllabus section tests, containing fewer questions than would be normally seen on an actual CAS Exam. We did so for the following reasons:

- i. To provide more questions from fewer readings to give you a better indication of where your strengths and weakness lie. As mentioned previously, CAS examiners have 40-50+ articles to develop questions.

Creating a 21-25 question exam that contains one question from the 25 available readings does not help a candidate to better assess what they know and what they don't know.

- ii. To create tests that require less time to complete, while offering a greater number of tests that cover the vast majority of content from the readings.

From least to most difficult, work Practice Tests, Practice Exams and e-Review Exams in this order.

CAS Exam 9

ALL 10 – Study Program

4 Main Goals in developing our Online Review Course:

IV. Develop a “Final Review Guide”

As mentioned earlier, we developed a “Final Review Guide” that distills key concepts, topics and formulas tested and testable, from the study manuals, into a set of “go to” documents during your final review.

It is crucial to have such a guide at your disposal weeks before the exam.

CAS Exam 9 - Study Manual and Final Review Guide Pages

| | | | Final Review Guide | |
|--|---|-------------|--|--|
| | | | # of Final Review Guide Pages Including Summarized Past CAS Questions | # of Final Review Guide Pages Excluding Summarized Past CAS Questions |
| Study Manual | | | | |
| | # of Article | | | |
| | Summary Pages | | | |
| | Including Past CAS Questions and Solutions | | | |
| Final Review Guide | | | | |
| | | | | |
| | | | | |
| | | | | |
| A1. Portfolio Theory and Index Models | | | | |
| Chapter 6 – Risk Aversion and Capital Alloc. | BKM | 33 | 10 | 7 |
| Chapter 7 – Optimal Risky Portfolios | BKM | 55 | 16 | 11 |
| Chapter 8 – Index Models | BKM | 28 | 8 | 7 |
| A2. Equilibrium in Capital Markets: CAPM, ETC | | | | |
| Chapter 9 – The Capital Asset Pricing Model | BKM | 54 | 19 | 11 |
| Chapter 10 – Arbitrage Pricing Theory | BKM | 32 | 11 | 8 |
| Chapter 11 – Market Efficiency | BKM | 29 | 6 | 3 |
| Chapter 12 – Behav Finance & Tech Analysis | BKM | 25 | 10 | 7 |
| B. Asset Liability Management | | | | |
| Chapter 15 –Term Structure of Interest Rates | BKM | 47 | 13 | 9 |
| Chapter 16 –Managing Bond Portfolios | BKM | 56 | 23 | 16 |
| Chapter 23 – Swaps | BKM | 28 | 9 | 9 |
| Managing Interest Rate Risk | Panning | 31 | 10 | 7 |
| C. Financial Risk Management | | | | |
| Chapter 14 Bond Yields | BKM | 44 | 9 | 8 |
| The Economics of Structured Finance | Coval, et. al. | 29 | 18 | 15 |
| Cat Bond and Other Risk-Linked Securities | Cummins | 35 | 19 | 16 |
| Risk-Adjusted Performance Measurement | Goldfarb | 73 | 42 | 34 |
| Allocation of Capital in the Insurance Industry | Cummins | 35 | 21 | 18 |
| Capital Allocation by Percentile Layer | Bodoff | 31 | 20 | 19 |
| Solvency: RBC Applications | Butsic | 38 | 16 | 12 |
| D. Rate of Return, Risk Loads, and Contingency Provision | | | | |
| Insurance Profitability | McClenahan | 25 | 10 | 7 |
| The Relationship of U/W Investment | Ferrari | 45 | 9 | 4 |
| The Underwriting Profit Provision | Robbin | 62 | 14 | 7 |
| IRR, ROE and PVI/PVE | Robbin | 34 | 25 | 24 |
| The Internal Rate of Return | Feldblum | 89 | 23 | 7 |
| Game Theory: Property Cat Risk Load - Part 1 | Mango | 62 | 13 | 13 |
| Game Theory: Property Cat Risk Load - Part 2 | Mango | | 12 | 4 |
| Riskiness Leverage Models | Kreps | <u>28</u> | <u>24</u> | <u>23</u> |
| Total Pages | | 1048 | 410 | 306 |
| Page Reduction Relative to Total Pages | | | 39% | 29% |
| #'s reflect Spring 2018 Manual - To be updated for Spring 2019 edition | | | | |

CAS Exam 9

ALL 10 – Study Program

2019 Course of Study

Our recommended study schedule follows order of the syllabus readings and our review course is both an asynchronous and structured 12-week exam preparation course.

Chart your own course of study and/or join in and follow our review course schedule which begins 1/1/2019 and concludes 3/25/2019.

This gives you about 5-6 weeks to focus on problem solving before the May 3, 2019 exam.

2019 Study Program – Description and Excerpts

Download our Study Program Excerpts Report located next to this document on the website.

This report contains a written description of all study program components, and excerpts of various study materials.

Study Manuals available in Print Format

For those candidates looking for both a digital and printed copy of the study manuals, you may purchase this option at

<https://www.actuarialbookstore.com/shop.aspx> or

<https://www.actexamdriver.com/>

If you have any questions, email us at support@all10.com

Again, we hope you find our commentary to be insightful and wish you the best in your preparation for the Spring 2019 CAS Exam 9.

-Rich

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