INSTRUCTIONS TO CANDIDATES

1. This 100 point examination consists of 49 questions divided into two sections. Section I contains 17 multiple choice questions worth one point each. Section II contains 32 problem and essay questions worth a total of 83 points.

2. To answer the multiple choice questions, use the short-answer card provided and a number 2 or HB pencil only. Mark your short-answer card during the examination period. No additional time will be allowed for this after the exam has ended. Please make your marks dark and fill in the spaces completely. Fill in that it is Spring 2004, and the exam number 5.

Darken the spaces corresponding to your Candidate ID number. Five rows are available. If your Candidate ID number is fewer than 5 digits, include leading zeros. (For example, if your Candidate ID number is 987, consider that your Candidate ID number is 000987, enter a zero on the first row, a zero on the second row, 9 on the third row, 8 on the fourth row, and 7 on the fifth [last] row.) Please write in your Candidate ID number next to the place where you darken the spaces for your Candidate ID number. Your name, or any other identifying mark, must not appear on the short-answer card.

For each of the multiple choice questions, select the one best answer and fill in the corresponding letter. One quarter of the point value of the question will be subtracted for each incorrect answer. No points will be added or subtracted for responses left blank.

3. For the problem and essay questions, the number of points for each full question or part of a question is indicated at the beginning of the question or part. Answer these questions on the lined sheets provided in your Examination Envelope. Use dark pencil or ink. Do not use multiple colors.

Write your Candidate ID number and the examination number, 5, at the top of each answer sheet. Your name, or any other identifying mark, must not appear.

Do not answer more than one question on a single sheet of paper. Write on only the lined side of the paper, and be careful to give the number of the question you are answering on each sheet.

The answer should be concise and confined to the question as posed. When a list of a specific size is requested, do not offer more items in your list than the number requested. For example, if you are requested to list three items, only the first three responses will be graded.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS
In order to receive full credit or to maximize partial credit on mathematical and computational questions, you must clearly outline your approach in either verbal or mathematical form, showing calculations where necessary. Also, you must clearly specify any additional assumptions you have made to answer the question.

4. Do all problems until you reach the last page of the examination where "END OF EXAMINATION" is marked.

5. Your Examination Envelope is pre-labeled with your Candidate ID number, name, exam number, and test center. Do not remove this label. Keep a record of your Candidate ID number for future inquiries regarding this exam.

6. At the beginning of the examination, check through the exam booklet for any missing or defective pages. The supervisor has additional exams for those candidates who have defective exam booklets.

7. Verify that you have received the reference materials:

8. Candidates must remain in the examination center until two hours after the start of the examination. You may leave the examination room to use the restroom with permission from the supervisor. To avoid excessive noise during the end of the examination, candidates may not leave the exam room during the last fifteen minutes of the examination.

9. At the end of the examination, place the short-answer card and all answer sheets in the Examination Envelope. Please insert your answer pages in your envelope in question number order. Insert a numbered page for each question, even if you have not attempted to answer that question. BEFORE YOU TURN THE EXAMINATION ENVELOPE IN TO THE SUPERVISOR, BE SURE TO SIGN IT IN THE SPACE PROVIDED ABOVE THE CUT-OUT WINDOW.

Anything written in the examination booklet will not be graded. Only the short-answer card and the answer sheets will be graded.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS
10. If you have brought a self-addressed, stamped envelope, you may put the examination booklet and scrap paper inside and submit it separately to the supervisor. It will be mailed to you. (Do not put the self-addressed stamped envelope inside the Examination Envelope.)

If you do not have a self-addressed, stamped envelope, please place the examination booklet in the Examination Envelope and seal the envelope. You may not take it with you. Do not put scrap paper in the Examination Envelope. The supervisor will collect your scrap paper.

Candidates may obtain a copy of the examination by contacting the CAS Office.

All extra answer sheets, scrap paper, etc., must be returned to the supervisor for disposal.

11. Candidates must not give or receive assistance of any kind during the examination. Any cheating, any attempt to cheat, assisting others to cheat, or participating therein, or other improper conduct will result in the Casualty Actuarial Society disqualifying the candidate's paper, and such other disciplinary action as may be deemed appropriate within the guidelines of the CAS Policy on Examination Discipline.

12. An examination survey and postage-paid reply envelope are included with the examination. No postage is necessary for surveys mailed within the United States. Candidates mailing the survey outside the United States should use the courtesy reply envelope distributed by your exam supervisor. This survey is also available on the CAS website in the “Exams” section. Please complete the survey and leave it with the examination supervisor, or take the survey and envelope with you when leaving the examination center. Please submit the survey to the CAS Office by May 23, 2004. Please do not enclose the survey in the Examination Envelope.

END OF INSTRUCTIONS
SECTION I, QUESTIONS 1 – 17, MULTIPLE CHOICE QUESTIONS (1 POINT EACH)

1. Tom gave Mike permission to use Tom’s car. Mike negligently injured a pedestrian while driving Tom’s car. The court granted the pedestrian $60,000 for his injuries.

   Mike’s ISO Personal Auto Policy had Bodily Injury Liability and Property Damage Liability limits of $100,000/$300,000/$50,000 and Tom’s ISO Personal Auto Policy had Bodily Injury Liability and Property Damage Liability limits of $50,000/$100,000/$25,000.

   According to the ISO Personal Auto Policy, how much will Mike’s insurer pay for this occurrence?

   A. $0
   B. $10,000
   C. $30,000
   D. $40,000
   E. $60,000

2. Which of the following is not an objective of a workers compensation system?

   A. Allow recovery for pain and suffering
   B. Promote safety
   C. Eliminate the costs of litigation
   D. Establish a guarantee of benefit payment
   E. Pay for medical care services
EXAM 5, SPRING 2004, SECTION I

3. Which of the following are the liability exposures that typically exist for a book store in a local shopping mall?

   1. Premises Liability
   2. Operations Liability
   3. Completed Operations Liability

   A. 1 only
   B. 2 only
   C. 1 and 2 only
   D. 2 and 3 only
   E. 1, 2, and 3

4. According to Malecki and Flitner, *Commercial Liability Insurance and Risk Management*, which of the following is not an exclusion from Products/Completed Operations coverage?

   A. Damage to your work
   B. Damage to impaired property
   C. Damage to your product
   D. Recall of products, work, or impaired property
   E. Damage resulting from failure of a product

5. Which of the following are true with regard to a liability insurer's duty to defend policyholders against suits?

   1. The insured is not obligated to cooperate with the defense attorney selected by the insurer.
   2. The defense attorney chosen by the insurer is professionally obligated to serve the insured's interest above all else.
   3. The insured has the right to involve an attorney of his own choice at his own expense.

   A. 1 only
   B. 2 only
   C. 3 only
   D. 2 and 3 only
   E. 1, 2, and 3

CONTINUED ON NEXT PAGE
6. A company purchases a Commercial Building and Personal Property (BPP) insurance policy with a limit of insurance for its property of $70,000. The actual value of the property is $100,000. The insurance policy has a coinsurance provision of 80% and a $200 deductible. A storm causes damage in the amount of $20,000 to the building and the insured submits a claim for the full amount of the damage. According to Webb et al., Insurance Operations and Regulation, what will the insurance company's payment be?

A. $15,800
B. $15,840
C. $17,300
D. $17,325
E. $19,800

7. Given the following data, calculate the trended loss ratio.

<table>
<thead>
<tr>
<th>Number of Insureds</th>
<th>Earned Premium</th>
<th>Developed Incurred Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>$50,000</td>
<td>$35,000</td>
</tr>
</tbody>
</table>

- Years of Trend = 2.5
- Annual Exposure Trend = 2.0%
- Annual Premium Trend = 2.9%
- Annual Frequency Trend = -1.0%
- Annual Severity Trend = 6.0%

A. Less than 68%
B. At least 68%, but less than 71%
C. At least 71%, but less than 74%
D. At least 74%, but less than 77%
E. At least 77%
8. Which of the following statements are true regarding loss trends?

1. When an exponential curve is used to approximate severity, the assumption is a constant multiplicative increase in severity.
2. Trend in claim severity is best approximated using a third-degree polynomial.
3. Linear trends tend to underestimate future costs when inflation is increasing at a multiplicative rate.

A. 1 only
B. 3 only
C. 1 and 2 only
D. 1 and 3 only
E. 2 and 3 only

9. Which of the following is true regarding ratemaking expense provisions?

1. Taxes, licenses and fees do not include federal income tax.
2. Other acquisition expenses include commission and brokerage expenses.
3. General administrative expenses represent all costs associated with the claim settlement process not directly assignable to specific claims.

A. 1 only
B. 2 only
C. 3 only
D. 1 and 2 only
E. 1 and 3 only

10. Which of the following statements is false regarding the loss ratio and pure premium methods for ratemaking?

A. The loss ratio and pure premium methods are identical when using consistent assumptions.
B. The pure premium method is preferable when on-level premium is difficult to calculate.
C. The loss ratio method produces indicated rate changes.
D. The pure premium method requires well-defined, responsive exposures.
E. The loss ratio method is preferable for a new line of business.

CONTINUED ON NEXT PAGE
11. Given the following data, calculate the policy year 2001 premium development factor from 24 to 36 months.

- Full estimated policy year premium is booked at inception, $10 million a month in 2001.
- Premium develops upward by 5% at the final audit, three months after the policy expires.
- All policies are annual.

A. Less than 1.010  
B. At least 1.010, but less than 1.015  
C. At least 1.015, but less than 1.020  
D. At least 1.020, but less than 1.025  
E. At least 1.025

12. Which of the following statements are true regarding claims-made ratemaking?

1. The investment income earned under claims-made policies is substantially less than the investment income earned under occurrence policies.  
2. An occurrence policy will generally cost less than a claims-made policy.  
3. Claims-made policies incur no liability for IBNR claims.

A. 1 only  
B. 3 only  
C. 1 and 2 only  
D. 1 and 3 only  
E. 2 and 3 only

CONTINUED ON NEXT PAGE
13. Given the information below, determine the indicated rate per exposure unit.

- Frequency per exposure unit = 0.25
- Severity = $100
- Fixed expense per exposure unit = $10
- Variable expense factor = 20%
- Profit and contingencies factor = 5%

A. Less than $35
B. At least $35, but less than $40
C. At least $40, but less than $45
D. At least $45, but less than $50
E. At least $50

14. What is the purpose of the off-balance adjustment when calculating new territorial rate relativities?

A. The off-balance adjustment is made to retain the same overall rate level.
B. The off-balance adjustment is made to keep the base territory relativity at unity.
C. The off-balance adjustment is made to assign the appropriate credibility to each territory.
D. The off-balance adjustment is made to prevent large losses from skewing relativities.
E. The off-balance adjustment is made to bring historical rates to current levels.

15. Which of the following generally increase for successively higher layers of loss?

1. Incremental increased limits factors
2. Credibility
3. Loss trends

A. 1 only
B. 3 only
C. 1 and 2 only
D. 2 and 3 only
E. 1, 2, and 3

CONTINUED ON NEXT PAGE
16. Based on Krakowski, "Quantifying the Impact of Non-Modeled Catastrophes on Homeowners Experience," which of the following are problems with most current non-modeled catastrophe ratemaking methodologies?

1. Trends in losses for non-catastrophe perils, such as liability and crime, are correlated to catastrophes.
2. Only non-wind catastrophes such as fire, explosion, and water are considered.
3. No consideration is given to changes in exposure concentration over time.

A. 1 only  
B. 3 only  
C. 1 and 2 only  
D. 2 and 3 only  
E. 1, 2, and 3

17. Which of the following statements are true concerning ISO’s Commercial General Liability (CGL) Experience Rating Plan?

1. The maximum single loss (MSL) limitation makes the plan more responsive to severity than frequency.
2. The MSL increases as the size of the risk increases.
3. The D-Ratio adjusts for the impact of the MSL.

A. 1 only  
B. 2 only  
C. 3 only  
D. 1 and 3 only  
E. 2 and 3 only

CONTINUED ON NEXT PAGE

7
18. (1 point)

With respect to umbrella liability policies, what is the distinction between a deductible and a self-insured retention from a claims handling perspective?

19. (2 points)

For each scenario depicted below, state which distribution system a new insurance company should select. Briefly explain your answer.

a. (0.5 point)

The company will write in a small geographical territory with high population density.

b. (0.5 point)

The company will write medium- to large-sized commercial lines business.

c. (0.5 point)

The company’s target customers are more interested in price than in service.

d. (0.5 point)

The company has limited funds and desires low initial fixed costs.
20. (1 point)

For each of the following policies, briefly compare the scope of coverage provided by the policy to the coverage provided by the underlying policy.

a. (0.5 point)
   Excess policy

b. (0.5 point)
   Umbrella policy

21. (2 points)

Using Rule 4 of the Insurance Services Office, Inc. Personal Auto Manual and the following information, determine the appropriate primary classification factor. Explain how you arrived at your selection.

The insured:
- Is a 28 year-old unmarried male.
- Owns the insured vehicle.
- Drives 25 miles one way to work twice a week.

<table>
<thead>
<tr>
<th>Primary Classification Description</th>
<th>Pleasure</th>
<th>Work Less Than 15 Miles</th>
<th>Work 15 or More Miles</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youthful Unmarried Male - Operator</td>
<td>2.0</td>
<td>2.1</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Youthful Unmarried Male - Owner or Principal Operator</td>
<td>2.5</td>
<td>2.6</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>All Other</td>
<td>1.5</td>
<td>1.6</td>
<td>1.7</td>
<td>1.8</td>
</tr>
</tbody>
</table>
EXAM 5, SPRING 2004, SECTION II

22. (1.5 points)
   a. (1 point)
      Explain the term Diminution in Value as it could apply to an automobile policy.
   b. (0.5 point)
      How has ISO responded to coverage for Diminution in Value in the Personal Auto Policy?

23. (4 points)
   An insured has a commercial general liability (CGL) policy with the following limits:
      • Each occurrence limit of $1,000,000
      • General aggregate limit of $2,000,000
      • Products/Completed Operations aggregate limit of $2,000,000
   The insured also has an umbrella policy with the following limits:
      • Each occurrence limit of $10,000,000
      • Aggregate limit of $25,000,000
      • Self-insured retention of $100,000
   If the insured has the following claims, how will the losses be allocated among the insured, the CGL policy, and the umbrella policy? Assume all claims are within the scope of the CGL policy. Show all work.

<table>
<thead>
<tr>
<th>Claim</th>
<th>Premises/Operations</th>
<th>Products/Completed Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claim 1</td>
<td>$500,000</td>
<td></td>
</tr>
<tr>
<td>Claim 2</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>Claim 3</td>
<td>$14,000,000</td>
<td></td>
</tr>
<tr>
<td>Claim 4</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>Claim 5</td>
<td>$1,000,000</td>
<td></td>
</tr>
<tr>
<td>Claim 6</td>
<td></td>
<td>$1,500,000</td>
</tr>
<tr>
<td>Claim 7</td>
<td></td>
<td>$500,000</td>
</tr>
</tbody>
</table>

CONTINUED ON NEXT PAGE
10
24. (2 points)
a. (1 point)
   Provide two reasons why the demand curve for the personal auto insurance industry is relatively flat with respect to price.

b. (1 point)
   List two ways in which a company offering personal auto insurance may alter the demand curve for its products.

25. (2.5 points)
a. (2 points)
   According to Webb et al., in Insurance Operations and Regulation, line underwriters are responsible for selecting and classifying risks. Explain two reasons why an underwriter's proper performance of these responsibilities is necessary to ensure the insurer's profitability.

b. (0.5 point)
   List two other functions that are the responsibility of the line underwriter.

26. (2 points)
a. (1 point)
   A soft market is characterized by downward pressure on insurance prices. Other than filing for a rate decrease, briefly describe two ways in which companies lower their prices in response to soft market conditions.

b. (1 point)
   How are rating bureau loss costs affected by soft or hard market conditions?

CONTINUED ON NEXT PAGE
11
27. (4 points)

The following questions refer to Bourdon, et al., "An Introduction to Capitation and Health Care Provider Excess Insurance."

a. (1 point)

Define “capitation” and give an example of a capitation arrangement.

b. (0.5 point)

Provide the reason coinsurance arrangements are used in specific excess loss insurance for capitated claims.

c. (1 point)

Give two reasons why the hospital may consider buying aggregate stop loss protection.

d. (1.5 points)

Discuss how each of the following may affect aggregate stop loss protection for capitation programs:

1. Morale Risk
2. Independence of Events
3. Fortuitous versus Scheduled Costs

28. (2 points)

List two typical policy limits that apply to Employers Liability coverage and give a brief description of each.
29. (4 points)

ABC Insurance Company writes standard auto business in State X and uses driver classification to rate policies. Based on the most recent analysis, a 5% rate level increase is needed in order to maintain rate adequacy. This rate level need varies by driver classification, as detailed in the table below.

<table>
<thead>
<tr>
<th>Driver Classification</th>
<th>Indicated Rate Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-40%</td>
</tr>
<tr>
<td>B</td>
<td>-20%</td>
</tr>
<tr>
<td>C</td>
<td>+20%</td>
</tr>
<tr>
<td>D</td>
<td>+40%</td>
</tr>
<tr>
<td>State Total</td>
<td>+5%</td>
</tr>
</tbody>
</table>

a. (1 point)

Other than an overall rate level increase, describe an action the insurance company could undertake to restore overall rate adequacy. Assume that the indicated rate need by driver classification does not change when the proposed action is taken.

b. (1 point)

Suppose that ABC Insurance Company’s chief competitor in State X has the same underwriting rules and writes a similar distribution of business as ABC Insurance Company. The competitor is rate adequate by driver classification as well as on a statewide basis. Describe the situation that could result if ABC Insurance Company fails to reflect the indicated changes by driver classification.

c. (1 point)

Suppose regulation was enacted abolishing the use of the driver classification rating variable for State X. Briefly describe the impact on ABC Insurance Company’s profitability.

d. (1 point)

Briefly describe the social consequences of the abolishment of the driver classification rating variable.

CONTINUED ON NEXT PAGE
30. (3.5 points)
   a. (1.5 points)
      State three desirable criteria for an exposure base.
   b. (2 points)
      For each of the lines of business listed below, state a reasonable exposure base and discuss the exposure base considering one of the criteria stated in part a. above.
      1. Workers Compensation
      2. Boatowners Insurance

31. (4 points)
   Given the following information, answer the questions below. Show all work.
   - Policies are written uniformly throughout the year.
   - Policies have a term of 12 months.
   - The law amendment change affects all policies in force.

   Assume the following rate changes:
   - Experience rate change on October 1, 2001 = +7%
   - Experience rate change on July 1, 2002 = +10%
   - Law amendment change on July 1, 2003 = -5%

   a. (2 points)
      Calculate the factor needed to adjust calendar year 2002 earned premium to current level.
   b. (2 points)
      Calculate the factor needed to adjust policy year 2002 earned premium to current level.
32. (3 points)

You are given the following information:

- Calendar year 2002 data is being reviewed for an indicated rate change with an effective date in 2004.
- Assume 50% of the business has an effective date of January 1, with the remaining business written evenly throughout the year.

For each of the situations below, describe:

1. The adjustments that should be made to the historical premium
2. The impact each situation has on the premium trend

a. (1 point)

A rate increase was taken in April 2002.

b. (1 point)

The minimum liability limit changed in June 2003.

c. (1 point)

The company has a model year rating plan, which assigns larger rating factors to more recently manufactured vehicles.
33. (3 points)

Given the following information, answer the questions below.

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>On-Level Earned Premium</th>
<th>Trended Ultimate Loss &amp; ALAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$800</td>
<td>$512</td>
</tr>
<tr>
<td>2001</td>
<td>$900</td>
<td>$540</td>
</tr>
<tr>
<td>2002</td>
<td>$1,000</td>
<td>$550</td>
</tr>
</tbody>
</table>

- Ratio of commissions to written premium = 14%
- Ratio of taxes, licenses and fees to written premium = 3%
- Ratio of other acquisition expenses to written premium = 2%
- Ratio of general expense to earned premium = 6.25%
- Profit and contingency provision = 5%
- Ratio of unallocated loss adjustment expenses to incurred loss and ALAE = 5%
- Assume each year of historical experience receives equal weighting.

a. (2 points)

Determine the indicated rate change for policies to be written from January 1, 2004 to December 31, 2004. Show all work.

b. (1 point)

Expenses can be related to written premium or earned premium. Briefly explain why other acquisition expenses are related to written premium, while general expenses are related to earned premium.

CONTINUED ON NEXT PAGE
34. (2 points)

Briefly discuss the characteristics of each of the following ratemaking approaches that cause them to be not well suited to increased limits ratemaking.

a. (1 point)

Loss ratio method

b. (1 point)

Pure premium method

35. (3 points)

You are given the following information. Using a two-step trending procedure as described in Jones, “An Introduction to Premium Trend,” answer the questions below. Show all work.

- The experience period is January 1, 2001 through December 31, 2003.
- Planned effective date is July 1, 2005.
- Rates are reviewed annually.
- Policies have a 6-month term.
- The trend will apply to calendar-accident year 2002 earned premium at current rate level.

a. (1 point)

Calculate the beginning and ending dates for each of the Step 1 and Step 2 trend periods, assuming the selected trend is based on average written premium.

b. (1 point)

Calculate the beginning and ending dates for each of the Step 1 and Step 2 trend periods, assuming the selected trend is based on average earned premium.

c. (1 point)

Describe a situation when it may be more appropriate to use a two-step trending procedure, rather than a one-step trending procedure.
36. (3 points)

Given the following information, calculate the indicated revised rates for each of the classifications. Show all work.

<table>
<thead>
<tr>
<th>Class</th>
<th>Class Relativity</th>
<th>On-Level Earned Premium</th>
<th>Experience Loss and ALAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>$500,000</td>
<td>$300,000</td>
</tr>
<tr>
<td>2</td>
<td>1.30</td>
<td>$600,000</td>
<td>$390,000</td>
</tr>
<tr>
<td>3</td>
<td>1.70</td>
<td>$700,000</td>
<td>$434,000</td>
</tr>
</tbody>
</table>

- Class 1 is the base class.
- Current base rate is $100.
- Overall statewide indicated rate level change is 14.0%.
37. (5 points)

Given the information below, answer the following questions. Show all work.

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Age 12</th>
<th>Age 24</th>
<th>Age 36</th>
<th>Age 48</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$1,412</td>
<td>$1,816</td>
<td>$1,993</td>
<td>$1,993</td>
</tr>
<tr>
<td>2001</td>
<td>$1,624</td>
<td>$2,023</td>
<td>$2,137</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>$1,841</td>
<td>$2,271</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>$2,421</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Ultimate losses are reached at age 48.
- The annual frequency trend is -2%.
- The annual severity trend is 8%.
- Planned effective date of rate change is July 1, 2004.
- Rates are reviewed annually.
- Policies have a term of 12 months.

a. (1 point)


b. (0.5 point)

Calculate the ultimate loss amount for accident year 2003.

c. (1 point)

Calculate the trended ultimate loss amount for accident year 2003.

d. (1.5 points)

Briefly describe three causes of loss development.

e. (1 point)

Briefly explain why it is appropriate to both trend and develop losses (i.e., why there is no overlap).
38. (1.5 points)

Credibility is an important consideration in ratemaking methodology.

a. (0.5 point)

Define credibility.

b. (0.5 point)

One method of increasing credibility is by increasing the size of the groupings analyzed. Briefly describe another method to increase credibility.

c. (0.5 point)

Explain a potential weakness in increasing credibility by the method you provided in part b. above.

39. (3 points)

Given the information below, calculate the premium for a policy with a $5,000 deductible. Show all work.

<table>
<thead>
<tr>
<th>Loss Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>0.45</td>
</tr>
<tr>
<td>0.35</td>
</tr>
<tr>
<td>0.15</td>
</tr>
<tr>
<td>0.05</td>
</tr>
</tbody>
</table>

- First dollar premium is $500,000.
- Ground-up expected loss ratio is 60%.
- Allocated Loss Adjustment Expenses (as a percentage of loss) is 10%.
- Fixed expense is $95,000.
- Variable expense is 12%.
- Profit and contingency provision is 3%.
- Assume the deductible applies to loss and ALAE.
40. (2 points)

Finger, in "Classification Ratemaking," discusses several criteria for rating variables. Some companies use information from credit reports as a rating variable.

State four criteria for rating variables and explain whether or not they are fulfilled by information from credit reports.

41. (4 points)

Given the following information on an individual property policy, answer the questions below. Show all work.

- The property value is $200,000.
- Assume no deductible applies.
- The frequency of non-zero loss is 10%.
- The severity of loss distribution is as follows:
  - 70% at 10% of value
  - 20% at 50% of value
  - 8% at 80% of value
  - 2% at 90% of value
- Coinsurance to 80% underlies the expected rate.
- Permissible loss ratio is 65%.

a. (2 points)

The insured purchases a policy insuring the property to 80% of value. Determine the premium charged for the policy.

b. (1 point)

The insured instead purchases a policy insuring the property to 70% of value. Assuming the same rate per $100 of insured value as in part a. above, determine the expected loss ratio for this policy.

c. (1 point)

Assume the insurer incorporates a coinsurance clause into the policy. The insured continues to insure the property to 70% of value. What is the expected loss ratio for this policy? Briefly explain your answer.
42. (2 points)

Explain both the regulatory need and the business need for aggregate insurance statistical data.

43. (3 points)

Using the ISO experience rating plan for a policy with premises/operations coverage and the following information, calculate the experience debit or credit. Show all work.

<table>
<thead>
<tr>
<th>Policy Period</th>
<th>Detrend Factors</th>
<th>Expected Percent of Basic Limits Loss &amp; ALAE Unreported as of September 30, 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>0.78</td>
<td>15%</td>
</tr>
<tr>
<td>2000</td>
<td>0.85</td>
<td>25%</td>
</tr>
<tr>
<td>2001</td>
<td>0.94</td>
<td>40%</td>
</tr>
</tbody>
</table>

- Policy being rated is a January 1, 2004 – December 31, 2004 occurrence policy.
- Premises/operations premium is $240,000.
- Reported loss and ALAE for experience period as of September 30, 2003 (limited by basic limits losses and MSL) is $300,000.
- Expected experience ratio is 0.90.
- Expected loss and ALAE ratio is 0.62.
- Maximum single limit per occurrence is $100,000.
- Credibility is 0.35.
- All policies in experience period are occurrence policies.
EXAM 5, SPRING 2004, SECTION II

44. \( (4 \text{ points}) \)
   
   a. \( (3 \text{ points}) \)
   
   You are given the following information about a group of policies:
   
   - The first year average policy premium is $1,000 and increases by 12% annually.
   - Premiums are collected at the beginning of each year.
   - The discounted first year loss ratio is 75%.
   - Loss cost trend is 10% per annum.
   - Loss costs improve by 4% per year, after adjusting for loss costs trends.
   - Expenses are $400 in year 1 and $100 in all subsequent years.
   - 90% of first year policyholders persist into the second year.
   - 90% of second year policyholders persist into the third year.
   - The company's cost of capital is 15%.
   - The premium to surplus ratio is 3 to 1.
   
   Using the asset share pricing model, determine the return on equity over the three-year period. Show all work.

   b. \( (1 \text{ point}) \)
   
   Explain how asset share pricing models and property/casualty insurance ratemaking methods differ in their consideration of the profitability of an insurance policy.

45. \( (2 \text{ points}) \)

   Given the following data, calculate the annual claims inflation rate in the layer $50,000 excess of $50,000. Assume a ground-up annual claims inflation rate of 15%. Show all work.

<table>
<thead>
<tr>
<th>Date of Loss</th>
<th>Ground-up Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1, 2003</td>
<td>$37,000</td>
</tr>
<tr>
<td>July 15, 2003</td>
<td>$47,000</td>
</tr>
<tr>
<td>October 1, 2003</td>
<td>$64,000</td>
</tr>
<tr>
<td>December 1, 2003</td>
<td>$93,000</td>
</tr>
</tbody>
</table>
46. (2 points)

Boor, in “The Complement of Credibility,” discusses using the trended present rates as the complement of credibility when using ratemaking data that is not fully credible.

a. (1 point)

Derive the pure premium complement of credibility using the data below. Show all work.

- Present pure premium rate is $150.
- Annual inflation rate is 4%.
- Original target effective date of the current rates was October 1, 2002.
- Amount indicated and requested in last rate change was 18%.
- Actual effective date was February 1, 2003.
- Amount approved in last rate change was 10%.
- Target effective date of the new rates is December 1, 2004.

b. (1 point)

State and briefly describe one advantage and one disadvantage of using this complement of credibility.

47. (1.5 points)

a. (1 point)

According to “Actuarial Standard of Practice No.13, Trending Procedures in Property/Casualty Insurance Ratemaking,” actuaries generally rely upon historical data from three different sources when determining loss trends. List those sources in order of preference, from most preferred to least preferred.

b. (0.5 point)

Under what circumstances would an actuary place more reliance on external data when determining loss trends?
48. (1.5 points)

Given the following data, answer the questions below. Show all work.

<table>
<thead>
<tr>
<th>Coverage Type</th>
<th>Mean Damage Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>2.0%</td>
</tr>
<tr>
<td>Other Structures</td>
<td>2.0%</td>
</tr>
<tr>
<td>Contents</td>
<td>1.6%</td>
</tr>
<tr>
<td>Additional Living Expense</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ISO HO-3 Coverage</th>
<th>Relationship to Coverage A Amount of Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Building</td>
<td>1.0</td>
</tr>
<tr>
<td>B - Other Structures</td>
<td>0.1</td>
</tr>
<tr>
<td>C - Contents</td>
<td>0.7</td>
</tr>
<tr>
<td>D - Additional Living Expense</td>
<td>0.2</td>
</tr>
</tbody>
</table>

a. (1 point)

Calculate the weighted mean damage ratio.

b. (0.5 point)

Calculate the expected hurricane losses for a Homeowners policy with a Coverage A amount of insurance of $300,000.

49. (2 points)

Given the following data, calculate the wind exclusion premium credit. Show all work.

- Base Class Loss Cost = $300
- Non-Modeled Loss Cost = $225
- Non-Wind Portion of Non-Modeled Loss Cost = 0.85
- Average Protection Construction Relativity = 1.05
- Variable Expenses = 0.175
- All expenses are variable

END OF EXAMINATION
Exam 5 – Spring 2004

1. B.
2. A.
3. A., C.
4. E.
5. C., D.
6. C.
7. C.
8. D.
9. A.
10. E.
11. B.
12. D.
13. D.
14. A.
15. B.
16. B.
17. E.
EXAM 5 US

QUESTION # 18

For a deductible policy, the insurer pays the full claim and then collects the deductible amount from the insured. The insured must report all claims below the deductible for claims processing.

For a self-insured policy, the insured need not report claims below the retention because the insured is responsible for processing and payment of these claims. The insurer only pays the amount of loss above the retention.
EXAM 5 US

QUESTION # 19

(A.) Exclusive agency or direct writer would suffice. Since business is in a concentrated area and large population the company can write a large volume of business, offsetting high initial costs of setting this distribution system up.

(B.) Independent agency – This type of business requires knowledge and skill of the agent as well as some specialized handling/services. As such, better to use independent agents that have this ability already.

(C.) Direct response will suffice. Direct response has no agents and contact insureds through other mediums (e.g. Mail). This reduces costs while sacrificing service.

(D.) Independent agents will do. The initial fixed costs of setting up an exclusive agent or direct writer are high. However, for independent agents, they are already established and have the ability to serve the policyholders, without the initial fixed costs.
EXAM 5 US

QUESTION # 20

(A.) Excess policies provide coverage that is either the same as the underlying policy or somewhat narrower.

(B.) Umbrella policies, on the other hand, usually provide not only excess and aggregate coverage matching the underlying policy but also provide coverage that was not present in the underlying policy. This additional coverage is subject to a self-insured retention.
4.C. Definitions

1.d. (2) (b) states -15 or more road miles one way, for not more than 2 days per week or not more than 2 weeks in any 5-week period.

Therefore, classified as **WORK LESS THAN 15 MILES**

2.a. (4) states - unmarried male under 30 years of age who is an owner or principal operator.

Therefore, Primary class factor = 2.6
EXAM 5 US

QUESTION # 22

(A.) “Diminution in Value” is the loss in value of an auto simply due to the fact that it has been in an accident, even if a complete repair was made. A car, which has been in an accident, has less value than one which has not.

(B.) Even though the ISO PAP unendorsed does not mention existence of coverage for Diminution in Value, the ISO has made available an Endorsement which specifically excludes coverage for diminution in value.
Under the CGL policy, claims less than or equal to 1,000,000 will be paid up to the general aggregate limit of $2,000,000. The General aggregate limit does not apply to Products/Completed Operation, so claims under Product/Completed Operation will be paid up to the Product/Completed Operation limit of $2,000,000.

For claim 3, since the loss is greater than the occurrence limit of both CGL and umbrella, the insured has to pay the amount of 3,000,000 on his/her own.

For claim 5, since the sum of the claims 1,2,3,4 are equal to the general aggregate limit of CGL, the loss on claim 5 will be paid under the umbrella policy.

For claim 6 and 7, both of them are claims from Product/Completed Operation, so it is subjected to the Product/Completed Operation aggregate limit, so CGL has to pay for each loss up to occurrence limit.
EXAM 5 US

QUESTION # 24

(A.)

(1.) Requirements by law – required by state law to buy personal auto liability coverage.

(2.) Requirements by lender to borrower – need to buy personal auto physical damage coverage to fulfill this requirement if the purchased auto is being financed.

(B.)

(1.) Emphasize financial strength of the insurance company.

(2.) Increase its flexibility to customize insurance program to meet individual customer’s need.
EXAM 5 US

QUESTION # 25

(A.)

(1.) Selection of insureds is crucial in ensuring profitability. The underwriter must be aware of what types of risks the company is assuming in their rates. If they select insureds outside of those risks, the rates may be inadequate and the company will lose money.

(2.) Classification of risks is likewise very important. Each class has its own rate specific to the exposures that group is exposed to. A misclassification results in pairing a risk with the wrong rate and thus, jeopardizing profitability.

(B.)

(1.) Determine the proper coverages needed.

(2.) Determine the right rate/ price to charge.
EXAM 5 US

QUESTION # 26

(A.)

(1.) To use Schedule rating or experience rating to give additional credits to the risk.

(2.) To transfer the risk to another company (a sister company) that has a lower level of rates.

(B.) In a soft market, reserve adequacy is lower and in a hard market, the adequacy of reserves is higher. The losses that are reported to rating bureaus are affected by the adequacy level of reserves (losses reported are lower in soft market and higher in hard market). So, when rating bureaus uses these reported losses to calculate their rates, rates are lower than they should be in soft market and higher than they should be in hard market.
EXAM 5 US

QUESTION # 27

(A.) Capitation is a fixed fee paid to a provider for a defined set of services within a specified period regardless of the actual cost of those services. An example is paying $100 per month per employee for healthcare services from an HMO.

(B.) This helps keep costs down by providing a financial incentive to the insured to only provide necessary treatment after the threshold has been met.

(C.)

(1.) There may be a high number of catastrophic cases that could financially ruin the hospital otherwise.
(2.) A difference of as little as 5 years between the average age of insured contemplated in the rates and the average age of the insured population can have devastating effects on the hospital’s profitability.

(D.)

(1.) Providers have exclusive control over the treatment of their patients – if there aren’t financial incentives, such as co-insurance, the providers may provide unnecessary services after the stop-loss protection has been triggered.
(2.) Many people in a small area may be injured or get sick – this is probably a small portion of overall costs.
(3.) Some healthcare services are scheduled (annual checkups, birth-control pills, etc) – this may make estimating the cost for an individual easier to estimate.
QUESTION # 28

(1.) Bodily Injury by accident: This is the maximum that the insurer will pay in any one accident for covered BI losses.

(2.) Bodily Injury by disease per employee: Maximum amount that the insurer will pay to each employee for covered BI injury caused by a disease.
(A.) The company could try to retain more insureds who would classify as A or B.

(B.) If ABC fails, then its good drivers will leave ABC for cheaper rates at the competitor and ABC will attract poor drivers (adverse selection) who can get lower rates at ABC.

(C.) If drivers were equally distributed among A, B, C and D, then there would be no impact. However, since the state total indicated rate change is positive (+5) there are more C and D drivers who need an increased rate for ABC to be profitable. So if the rating was abolished, ABC would be less profitable.

(D.) Abolishment will decrease loss control incentives.
EXAM 5 US

QUESTION # 30

(A.)

(1.) The exposure base should vary with the risk
(2.) It should be verifiable
(3.) Easy to Compute

(B.) Workers Compensation – Total payroll is a reasonable exposure base. It is available because it is reported on the insured’s federal income tax forms.

Boat Owner’s Insurance – Boat-years is a reasonable exposure base. This base varies with the risk – the more boats owned by the insured, the more exposure he has.
EXAM 5 US

QUESTION # 31

(A.)

<table>
<thead>
<tr>
<th></th>
<th>Area</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(.75)(.75)(.5) = .28125</td>
<td>1.00</td>
</tr>
<tr>
<td>B</td>
<td>1-(A)-(C) = .59375</td>
<td>1.07</td>
</tr>
<tr>
<td>C</td>
<td>(.5)(.5)(.5) = .125</td>
<td>(1.07)(1.1) = 1.177</td>
</tr>
<tr>
<td>Current</td>
<td>(1.07)(1.1)(.95) = 1.118</td>
<td></td>
</tr>
</tbody>
</table>

On-level factor = 1.118/[1.0(.28125) + 1.07(.59375) + 1.177 (.125)] = 1.051

(B.)

<table>
<thead>
<tr>
<th></th>
<th>Area</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1-(A)–(C) = .375</td>
<td>1.10</td>
</tr>
<tr>
<td>C</td>
<td>(.5)(.5)(.5) = .125</td>
<td>(1.1)(.95) = 1.045</td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td>1.045</td>
</tr>
</tbody>
</table>

On-level factor = 1.045/ [1.0(.5) + 1.1(.375) + 1.045(.125)] = 1.002
EXAM 5 US

QUESTION # 32

(A.) Rate increase April 2002
1. Increase premium by this on-level factor

\[ x = \text{rate change in April} \]

\[ \text{CRLF} = (1 + X) / [1 + (0.50 + (3/12)(0.5))x] \quad \Rightarrow \text{1/2 business written Jan 1, 3/12 remaining premium written in Jan, Feb, Mar} \]

\[ = (1 + X) / (1 + 0.625x) \]

Or use extension of exposures

2. Amount of trend wouldn’t change, since made one-time adjustment to premium. Make sure to use on-level average premiums when calculating trends so there’s no double counting.

(B.) Minimum Liability Limit
1. A one time change reflected in premium by taking % of premium at the minimum limit and multiply by a factor that represents increase.

For example, 20% of the experience (CY2002) premium was written at min limits of 25,000. The new minimum liability is 50,000. Increase premium by:

\[ .20 \times (\text{ILF for 50,000}) / (\text{ILF for 25,000}) \]

This gives rough approximation of effect on premium.

2. Trend wouldn’t change (but make sure to reflect this change when calculating trend so there’s no double-counting

(C.)

1. No adjustments made for historical premium => this change should be reflected in trend (see below)

2. This gradual change in premium (as people sell or turn in old cars and buy new ones, premiums trend upwards) should be reflected when calculating premium trend.
EXAM 5 US

QUESTION # 33

(A.)
Projected Ultimate Loss and ALAE Ratio
2000: 512/800 = .64
2001: 540/900 = .6
2002: 550/1000 = .55
equal weighting ⇒ W=0.59667
V = .14 + .03 + .02 + .0625
Q = .05
G = .05
T = (1-V- Q)/(1+G) = (1-.2525 - .05)/(1+.05)= .6643
W/T = .59667/.6643 = .8982

Indicated Rate Change = .8982 – 1 = - 10.18%

(B.) Other acquisition expenses are assumed to be incurred mainly at the beginning of the policy, in the effort/process of “acquiring” the policy, so it makes more sense to relate to Written Premium.

General expenses like salary/overhead would continue to incur even if policies ceased to be written, so it makes more sense to relate to Earned Premium.
EXAM 5 US

QUESTION # 34

Loss Ratio Method: Premium for total limits cannot easily be broken down into separate portions for basic and excess limits.

Increased Limit (IL) rates are a function of Basic limit (BL) rates so the IL experience cannot provide indication to relationship between IL and BL.

Pure premium method: Not useful for evaluating current rating procedure which use IL rates that are a function of BL rates.

Data is scarce for higher layers and this will be a problem when analyzing by class and territory to obtain relativities.
EXAM 5 US

QUESTION # 35

(A.)

Average date for last data point in avg written date series = 7/1/03

Step 1  trend from avg. written Date of 4/1/02 to 7/1/03 ← 7/1/03

Step 2 trend from 7/1/03 to avg. written under effective period of 1/1/06

(B.) Step 2 still begins on 7/1/03
Now ends on average earned date of future period of 4/1/06
Step 1 from avg earned of 7/1/02 to 7/1/03

Step 1 from 7/1/02 to 7/1/03
Step 2 from 7/1/03 to 4/1/06

(C.) Two step trending is more appropriate when there isn’t a clear trend in the series of avg. written or earned premiums. For example, if the series looked like

Avg premium

12 month moving average

Quarter

It would be inappropriate to apply a single trend, since the lower premium at the midpoint needs much more trend that either the beginning or end.
EXAM 5 US

QUESTION # 36

<table>
<thead>
<tr>
<th>Class</th>
<th>Current relativity</th>
<th>OLEP</th>
<th>Class 1 OLEP</th>
<th>Loss</th>
<th>Loss Ratio</th>
<th>Indicated relativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>500,000</td>
<td>500,000</td>
<td>300,000</td>
<td>.6</td>
<td>1.000</td>
</tr>
<tr>
<td>2</td>
<td>1.3</td>
<td>600,000</td>
<td>461,538</td>
<td>390,000</td>
<td>.845</td>
<td>1.408</td>
</tr>
<tr>
<td>3</td>
<td>1.7</td>
<td>700,000</td>
<td>411,765</td>
<td>434,000</td>
<td>1.054</td>
<td>1.757</td>
</tr>
</tbody>
</table>

Off balance Factor = \( \frac{\text{Sum}(\text{OLEP})}{\text{Sum}(\text{OLEP} \times \text{ind rel} / \text{curr rel})} \)

\[
= \frac{1,800,000}{(500,000 \times 1/1 + 600,000 \times 1.408/1.3 + 700,000 \times 1.757/1.7)}
\]

New Base Rate = Current rate \times S/W rate change \times off balance factor

\[
= 100 \times 1.14 \times .961 = 109.55
\]

Revised Rates: New Base Rate \times indicated relativity

Class 1 = 109.55 \times 1 = 109.55
Class 2 = 109.55 \times 1.408 = 154.25
Class 3 = 109.55 \times 1.757 = 192.48
EXAM 5 US

QUESTION # 37

(A.)

<table>
<thead>
<tr>
<th></th>
<th>12:24</th>
<th>24:36</th>
<th>36:48</th>
<th>48: ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.2861</td>
<td>1.0991</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>1.2457</td>
<td>1.0564</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>1.2336</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
<td>Given</td>
<td></td>
</tr>
<tr>
<td>AVG</td>
<td>1.2551</td>
<td>1.0778</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Ex: 2000 12:24 = 2000 @ 24 = 1816
     2000 @ 12 = 1412

AY 2003 @ 12/31/03 is 12 months mature, need @ 12:ult factor
        = (1.2551) (1.0778) (1.0) (1.0)
12:ult = 1.3527

(B.) AY 2003 ult = 2421 x 1.3527 = 3275

(C.)

loss x (freq x sev)^T = (3275) [(0.98) (1.08)]^2 = 3669

Need to trend 2 years from average data of accident for 2003 AY losses (ie from 7/1/03) to avg. date of average policy. Average policy is written on 1/1/05 so average date is 7/1/05
7/1/03 → 7/1/05 = 2 years
EXAM 5 US

QUESTION # 37 (CONT’D)

(D.) 3 causes of loss development

1.) development on known cases.
   i.e., Reserves initially set too low, and then increase as more is learned
   about the claim.

2.) New cases being reported
   i.e., Due to late reporting

3.) Old, closed cases being reopened
   i.e., Due to damages resulting from original occurrence.

(E.) There is no trend overlap

Trend develops losses from the midpoint of the experience period to the midpoint
of the exposure period.

Development takes the losses from the midpoint of the exposure period to
ultimate.
ESSAY 5 US

QUESTION # 38

(A.) Credibility is determined by how much experience is expected to be a good predictor of future experience.

(B.) Another method would be to increase the homogeneity of groupings analyzed. The more stable and homogeneous a group, the larger the credibility.

(C.) There needs to be a balance between the size of the groupings and how homogeneous you make the groupings. If groups are segregated too much in an attempt to increase homogeneity, the groups will be too small to be credible.
EXAM 5 US

QUESTION # 39

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Loss Amount</th>
<th>Loss and ALAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>.45</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>.35</td>
<td>2500</td>
<td>2750</td>
</tr>
<tr>
<td>.15</td>
<td>10000</td>
<td>11000</td>
</tr>
<tr>
<td>.05</td>
<td>25000</td>
<td>27500</td>
</tr>
</tbody>
</table>

Loss elimination ratio =losses under deductible/ total losses

\[
= \frac{(0.45 \times 550 + 0.35 \times 2750 + (0.15 + 0.05) \times 5000)}{(0.45 \times 550 + 0.35 \times 2750 + 0.15 \times 11000 + 0.05 \times 27500)}
\]

\[
= \frac{247.5 + 962.5 + 1000}{247.5 + 962.5 + 1650 + 1375}
\]

\[
= \frac{2210}{4235} = .5218
\]

Premium for 5000 deductible policy

\[
= \frac{\text{first dollar premium} \times \text{expected loss ratio} \times (1 - \text{LER}) \times \text{ALAE factor} + \text{Fixed Expense}}{(1 - \text{var Exp} - \text{contingency})}
\]

\[
= \frac{[500,000 \times 0.60 \times (1.10) \times (1 - 0.5218) + 95000]}{(1 - 0.15)}
\]

\[
= \frac{330000 \times 0.4782 + 95000}{0.85} = 297419
\]
EXAM 5 US

QUESTION # 40

(1.) Privacy: not fulfilled, people consider credit reports private.

(2.) Causality: not fulfilled, a bad credit report does not cause more claims (or more severe claims).

(3.) Controllable: is fulfilled, by managing finances, paying off debts, credit reports are controllable.

(4.) Available: fulfilled, companies can run credit reports quite easily.
EXAM 5 US

QUESTION # 41

(A.) Expected Losses = 200,000x(.10)x[.7(.10) + .2(.5) + .10(.8)] = 5000
Premium = 5000/.65 = $7,692

(B.) Per $100 rate = 7692/1600 = 4.81
Premium = (4.81) (1400) = 6731
Expected Losses = (200,000)x(.10)x[.7(.10) + .2(.5) + .10(.7)] = 4800
Loss Ratio = 4800/6731 = .7131 = 71.3%

(C.) Loss Ratio = 65%
This is because now all payments will be reduced by the amount of coinsurance that the insured has in proportion to what was required. Losses in excess of 80% will be paid out for $140,000.

Expected Losses = (200,000)x(.10)x[.7(.10) (.7/.8) + .2(.5)(.7/.8) + .10(.7)]
= 4375
Loss Ratio = 4375/6731 = 65.0%
Regulators need aggregate insurance statistical data such as premium and loss information to ensure that rates are reasonable, not excessive, inadequate, or unfairly discriminating.

Individual insurers might not have enough credible experience data for ratemaking, so they rely on aggregate insurance statistical data.
### QUESTION # 43

<table>
<thead>
<tr>
<th></th>
<th>Subject Premium</th>
<th>ELR</th>
<th>Detrend Factor</th>
<th>Subject Loss Cost</th>
<th>EER</th>
<th>Unreported %</th>
<th>Unreported Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>99</td>
<td>240,000</td>
<td>0.62</td>
<td>0.78</td>
<td>116,064</td>
<td>0.9</td>
<td>0.15</td>
<td>15,669</td>
</tr>
<tr>
<td>00</td>
<td>240,000</td>
<td>0.62</td>
<td>0.85</td>
<td>126,480</td>
<td>0.9</td>
<td>0.25</td>
<td>28,458</td>
</tr>
<tr>
<td>01</td>
<td>240,000</td>
<td>0.62</td>
<td>0.94</td>
<td>139,872</td>
<td>0.9</td>
<td>0.40</td>
<td>50,354</td>
</tr>
</tbody>
</table>

Development needed on experience period because of occurrence policies.

Experience Losses Limited by MSL
\[= 300,000 + 94481 = 394,481 \text{ where 94481 is development} \]

Subject loss cost = 382,416

\[\text{AER} = \frac{394,481}{382,416} = 1.0315 \]

\[\text{EER} = 0.9 \]

\[\text{M} = \frac{(\text{AER} - \text{EER})}{\text{EER}} \times Z = 0.051 \text{ (debit)} \]

\[\text{M} = + 5.1\% \]
EXAM 5 US

QUESTION # 44

<table>
<thead>
<tr>
<th>Period</th>
<th>Premium</th>
<th>Losses</th>
<th>Expense</th>
<th>Persistency</th>
<th>Cum Per</th>
<th>Profit</th>
<th>Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,000</td>
<td>750</td>
<td>400</td>
<td>100%</td>
<td>100%</td>
<td>-150</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1,120</td>
<td>793.27</td>
<td>100</td>
<td>90%</td>
<td>90%</td>
<td>204.06</td>
<td>1/1.15</td>
</tr>
<tr>
<td>3</td>
<td>1,254.4</td>
<td>839.03</td>
<td>100</td>
<td>90%</td>
<td>81%</td>
<td>255.45</td>
<td>1/1.15^2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period</th>
<th>PV Profit</th>
<th>PV Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-150</td>
<td>1000</td>
</tr>
<tr>
<td>2</td>
<td>177.44</td>
<td>876.52</td>
</tr>
<tr>
<td>3</td>
<td>193.16</td>
<td>768.29</td>
</tr>
<tr>
<td>total</td>
<td>220.6</td>
<td>2644.81</td>
</tr>
</tbody>
</table>

(A.)
⇒ Return on Premium  = 8.34 %
⇒ Return on Equity      = 25.0%

(B.) P&C methods consider only the upcoming policy period – will premium be enough to cover losses and expenses in the upcoming period.

Asset share pricing looks at profitability over the life of the policy, taking into account persistency patterns.
## QUESTION # 45

<table>
<thead>
<tr>
<th>Date</th>
<th>Untrended Loss</th>
<th>Untrended 50 x 50</th>
<th>Trended Loss</th>
<th>Trended 50 x 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/1/03</td>
<td>37,000</td>
<td>0</td>
<td>42,550</td>
<td>0</td>
</tr>
<tr>
<td>7/15/03</td>
<td>47,000</td>
<td>0</td>
<td>54,050</td>
<td>4,050</td>
</tr>
<tr>
<td>10/1/03</td>
<td>64,000</td>
<td>14,000</td>
<td>73,600</td>
<td>23,600</td>
</tr>
<tr>
<td>12/1/03</td>
<td>93,000</td>
<td>43,000</td>
<td>106,950</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>57,000</td>
<td></td>
<td>77,650</td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{77,650}{57,000} - 1 = 36.2\%
\]
EXAM 5 US

QUESTION # 46

(A.) Trend period ➔ 10/1/02 – 12/1/04

Complement = (150 x pres trend x Required Change/Approved Change)

= 150 x 1.04^{2.167} x 1.18/1.1

= 175.183

(B.) It is unbiased in the sense that the pure trended loss costs are unbiased; it is easy to compute and independent of basic statistic. But it is inaccurate when the loss cost process variance is great.
EXAM 5 US

QUESTION # 47

(A.) Historical data of the book of business being priced
Other insurance data
Non insurance data

(B.) If the internal data is not credible or there is no historical data (new line of business), an actuary should place more reliance on external data.
(A.)

<table>
<thead>
<tr>
<th>ISO HO-3 Coverage</th>
<th>(1) Relationship to Coverage A Amount of Insurance</th>
<th>(2) Mean Damage Ratio</th>
<th>(3) = (1) x (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – Building</td>
<td>1.0</td>
<td>2.0%</td>
<td>0.02</td>
</tr>
<tr>
<td>B – Other Structures</td>
<td>0.1</td>
<td>2.0%</td>
<td>0.002</td>
</tr>
<tr>
<td>C – Contents</td>
<td>0.7</td>
<td>1.6%</td>
<td>0.0112</td>
</tr>
<tr>
<td>D – Additional Living Expense</td>
<td>0.2</td>
<td>1.8%</td>
<td>0.0036</td>
</tr>
</tbody>
</table>

Weighted Mean Damage Ratio = 0.0368

(B.) Expected hurricane losses for a homeowners policy with coverage A amount of insurance of $300,000

300,000 x 0.0368 = 11,040
EXAM 5 US

QUESTION # 49

Wind exclusion credit = (BCLC – NR) PC
  = (300 – 225 x .85) 1.05
  = 114.19

Premium Credit = (114.19)/(1-.175) = 138.41