General Insurance
Ratemaking and Reserving

Exam GI 101

Date: Friday, November 21, 2025

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 11 questions numbered through 11 with a total of 50 points.

   The points for each question are indicated at the beginning of the question.

2. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions provided in this document.

Written-Answer Instructions

1. Each question should be answered in the Excel file. Graders will only look at work in the Excel file.

2. Calculations should be done in Excel and entered as formulas. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit. Rows can be inserted to the answer input area as required to provide space for your answer.

2. The answer should be confined to the question as set.

3. Prior to uploading your Excel file, the file should be saved and renamed with your unique candidate number in the filename.

4. The Excel file that contains your answers must be uploaded before the five-minute upload period expires.

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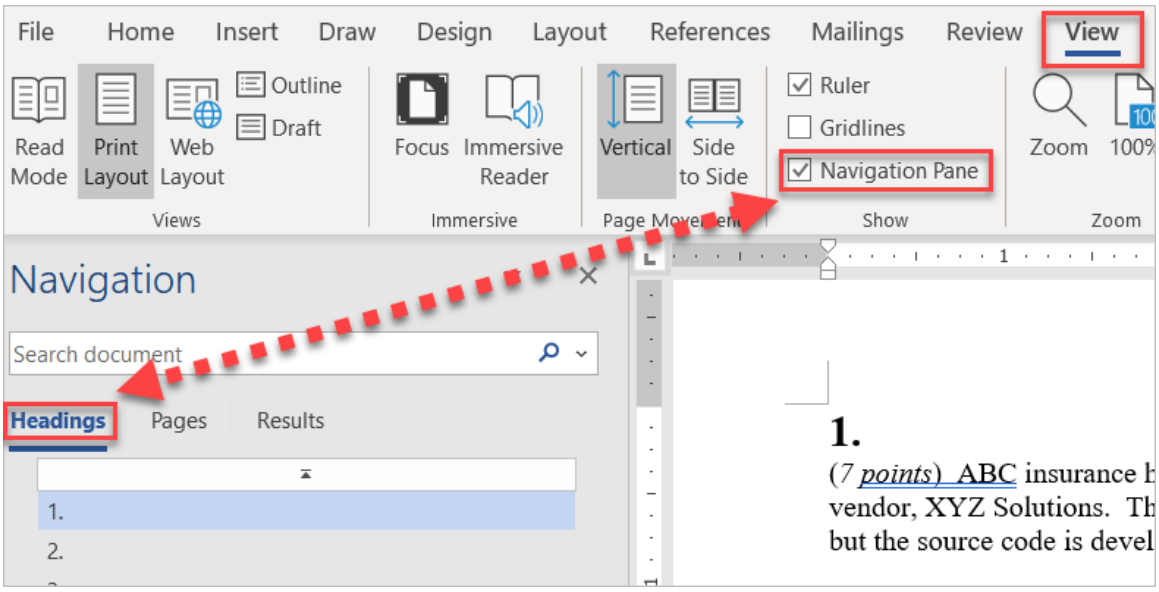
Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



1.

Provide the response for this question in the Excel spreadsheet.

(*3 points*) You are conducting a ratemaking exercise and are given:

Accident Year	Earned Exposure	Ultimate Counts
2021	11,064	171
2022	12,334	186
2023	12,329	220
2024	14,576	215
2025	14,391	217

- The full credibility standard is 1,082 ultimate counts.

(a) (*1.5 points*) Recommend the weights to assign to each year when estimating the weighted average trended claim ratio for the indicated rate change. Justify your recommendation.

(b) (*0.5 points*) Calculate the credibility assigned to the experience using the square root rule associated with classical credibility.

(c) (*1 point*) Describe two options for the complement of credibility.

2.

Provide the response for this question in the Excel spreadsheet.

(*6.5 points*) You are estimating ultimate claims using the development method.

(a) (*1 point*) Describe one advantage and one disadvantage of using the paid development method rather than the reported development method.

You are given:

Accident Year (AY)	Cumulative Paid Claims					
	12	24	36	48	60	72
2019	2,613,543	3,986,271	5,017,264	5,842,868	6,527,872	6,765,870
2020	2,833,584	4,292,265	5,387,622	6,260,073	6,955,401	
2021	3,048,854	4,604,657	5,784,290	6,705,184		
2022	3,237,137	4,906,937	6,105,679			
2023	3,480,198	5,262,244				
2024	3,725,398					

Accident Year (AY)	Reported Claims					
	12	24	36	48	60	72
2019	4,565,706	5,326,159	5,982,698	6,246,372	6,577,566	6,765,870
2020	4,877,798	5,631,950	6,247,419	6,702,579	7,007,969	
2021	5,170,006	5,998,124	6,651,175	7,104,615		
2022	5,405,481	6,352,469	6,914,951			
2023	5,771,368	6,681,087				
2024	6,055,138					

You are evaluating the paid claims to reported claims ratios.

(b) (*1.5 points*) Describe two possible reasons for the observed pattern of change down the 12-month column.

(c) (*2 points*) Calculate the IBNR for AY 2024 as of December 31, 2024 using the paid development method and the original Bondy method as the tail factor. Justify any selections you make.

(d) (*1 point*) Assess the appropriateness of using the paid development method to estimate IBNR in this situation.

(e) (*1 point*) Recommend another investigative test to improve your IBNR analysis, assuming you have additional data as needed. Justify your recommendation.

3.

Provide the response for this question in the Excel spreadsheet.

(*4 points*) You are evaluating catastrophic and large claims for a ratemaking analysis.

(a) (*1 point*) Describe how the occurrence of catastrophe events affects the frequency and severity of an insurance company's total claims.

(b) (*1 point*) Describe how the occurrence of large claims affects the frequency and severity of an insurance company's total claims.

You are estimating a wildfire loading for ratemaking purposes and are given:

Accident Year	Earned House Years	Wildfire Ultimate	
		Counts	Claims
2015	21,923	1	350,000
2016	22,270	0	0
2017	22,724	0	0
2018	23,127	2	1,210,000
2019	23,503	0	0
2020	23,901	0	0
2021	24,179	0	0
2022	24,433	3	760,000
2023	24,752	0	0
2024	25,392	4	900,000

- New rates are to be effective April 1, 2026 for one year.
- All policies are written as twelve-month policies.
- The annual severity trend is 7%.
- The annual frequency trend is –1%.
- The 2024 trended earned premium at current level is 17,500,000.

(c) (*2 points*) Calculate the wildfire loading as a claim ratio.

4.

Provide the response for this question in the Excel spreadsheet.

(*3 points*) You are given the following for a line of business:

- The number of policies in force as of December 31, 2023 was 5,600.
- The annual premium for each policy in force as of December 31, 2023 was 1,200.
- 95% of the policies in force on December 31, 2023 renewed in 2024.
- The premiums for all policies written or renewed on or after July 1, 2024 were increased by 5%.
- The number of new policies written in 2024 was 900.
- All policies are written for 12-month policy terms.
- All policies are written and earned evenly throughout the policy term.

(a) (*1 point*) Calculate the calendar year 2024 written premiums for the policies that renewed in 2024.

(b) (*1 point*) Calculate the calendar year 2024 written premiums for the new policies written in 2024.

You have calculated on level factors for CY 2024 using the information above.

(c) (*1 point*) Explain whether the CY 2024 on level factors would be higher or lower if 50% of the policies written in 2024 were written for 6-month policy terms.

5.

Provide the response for this question in the Excel spreadsheet.

(*4.5 points*)

Ratio-based methods and count-based methods are two types of actuarial methods for estimating unpaid unallocated loss adjustment expenses (ULAE).

(a) (*1 point*) Describe two major drawbacks of ratio-based methods that are likely resolved by count-based methods.

You are estimating unpaid ULAE as December 31, 2024 using the Wendy Johnson count-based method. The following weights for three different claim types are:

Newly reported counts	30%
Open counts	50%
Closed counts	20%

You are given the following information:

Calendar Year	Paid ULAE	Newly Reported Counts	Closed Counts
2021	359,580	1,180	1,064
2022	369,300	904	900
2023	373,500	860	838
2024	393,900	870	842

- Open counts as of December 31, 2020 are 750.
- The annual ULAE trend is 3%.

(b) (*2 points*) Recommend an average ULAE per weighted count. Justify your recommendation.

5. Continued

You are also given the following projected reported and closed claim counts as of December 31, 2024:

Calendar Year	Newly Reported Counts	Closed Counts
2025	238	548
2026	99	370
2027	35	170
2028	0	128
2029	0	76

(c) (*1.5 points*) Calculate the unpaid ULAE as of December 31, 2024.

6.

Provide the response for this question in the Excel spreadsheet.

(*5 points*) You are estimating the unpaid claims using the expected method and are given:

Rate Change History	
Effective Date of Rate Change	**Rate Change %**
Jul. 1, 2018	6%
Sep. 1, 2019	4%
Apr. 1, 2021	–20%
Sep. 1, 2023	3%

- There were no rate changes prior to July 1, 2018 and there have been no rate changes since September 1, 2023.
- All policies are written for 6-month policy terms.

(a) (*2 points*) Calculate premium on-level factors to use for projecting ultimate claims as of December 31, 2024, for accident years 2018 through 2024.

You are also given:

Accident Year	Earned Premiums	Ultimate Claims as of Dec. 31, 2024
2018	9,956,743	6,574,878
2019	10,331,409	6,997,575
2020	10,990,536	7,031,623
2021	11,548,428	6,368,826
2022	9,409,209	6,676,849
2023	9,876,766	7,378,658
2024	10,286,627	7,581,748

- Tort reform reduced claim costs by 20% for all accidents occurring on or after April 1, 2021.
- The annual claim ratio trend is 5.0%.

(b) (*2 points*) Recommend a 2024 cost level expected claim ratio using the expected method. Justify your recommendation.

(c) (*1 point*) Calculate the accident year ***2020*** expected claims.

7.

Provide the response for this question in the Excel spreadsheet.

(*4.5 points*) You are estimating ultimate claims and are given:

Accident Year	Earned Exposures	Selected Ultimate Counts from Development Method
2018	14,596	746
2019	14,950	748
2020	15,264	752
2021	15,271	838
2022	15,545	849
2023	15,737	845
2024	15,855	844

- There was a court ruling resulting in a change in case law where all insurance companies writing this line of business saw an increase in claim counts of 10% effective January 1, 2021.
- This change in case law did not affect the claim severity for this line of business.

(a) (*2 points*) Recommend an annual frequency trend for use with the development-based frequency-severity method. Justify your recommendation.

(b) (*1.5 points*) Calculate the ultimate counts for all accident years using the development-based frequency-severity method and your recommendation from part (a).

You are also given:

- The selected severity at the 2024 cost level is 12,400.
- The annual severity trend is 7%.

(c) (*1 point*) Calculate the ultimate claims as of December 31, 2024 for all accident years using the development-based frequency-severity method and the ultimate counts from part (b).

8.

Provide the response for this question in the Excel spreadsheet.

(*6 points*) You are estimating ultimate claims for a line of business and need to apply a Berquist-Sherman adjustment for a change in case adequacy. You are given:

Accident Year	Cumulative Paid Claims					
	12	24	36	48	60	72
2019	1,991,607	3,376,861	4,771,506	5,966,546	6,837,261	7,529,454
2020	2,102,873	3,852,753	5,183,911	6,324,931	7,336,173	
2021	2,123,942	3,902,072	5,496,322	6,737,688		
2022	2,408,832	4,397,287	6,134,142			
2023	2,403,188	4,460,568				
2024	2,787,327					

Accident Year	Reported Claims					
	12	24	36	48	60	72
2019	3,759,658	4,829,472	5,890,182	6,708,585	7,217,625	7,560,927
2020	3,984,406	5,388,587	6,360,769	7,119,570	7,787,844	
2021	4,167,634	5,508,351	6,764,677	7,690,156		
2022	4,896,994	7,299,550	9,009,520			
2023	4,688,943	6,527,570				
2024	5,514,933					

Accident Year	Closed Counts					
	12	24	36	48	60	72
2019	435	631	791	921	1,010	1,081
2020	431	645	800	926	1,015	
2021	433	640	789	921		
2022	444	648	808			
2023	436	648				
2024	437					

Accident Year	Reported Counts					
	12	24	36	48	60	72
2019	735	857	961	1,042	1,087	1,117
2020	732	872	972	1,047	1,092	
2021	736	865	961	1,044		
2022	743	880	984			
2023	731	876				
2024	741					

8. Continued

The following two large claims are included in the above data triangles:

- Large claim #1 occurred in calendar year (CY) 2022 and was reported in CY 2022:

Calendar Year (CY)	Payments Made in CY	Case Estimate at End of CY
2022	0	350,000
2023	150,000	550,000
2024	50,000	550,000

- Large claim #2 occurred in CY 2022 and was reported in CY 2023:

CY	Payments Made in CY	Case Estimate at End of CY
2022	0	0
2023	0	570,000
2024	0	850,000

You need to adjust the data for the large claims prior to the Berquist-Sherman adjustment for a change in case adequacy.

(a) (*2 points*) Revise the AY 2022 rows for the reported claims and cumulative paid triangles to remove the large claims.

(b) (*1.5 points*) Revise the AY 2022 rows for the reported counts and closed counts triangles to remove the large claims.

You are also given:

- This line of business had a strengthening of case adequacy in the most recent calendar year.
- The annual claim severity trend is 6.3%.
- Selected reported claims development factors, excluding large claims, are:

Selected Reported Claims Age-to-Ultimate Development Factors by Maturity Age					
12	**24**	**36**	**48**	**60**	**72**
2.185	1.636	1.347	1.191	1.097	1.048

(c) (*1.5 points*) Calculate the AY 2022 reported claims for all maturity ages with an adjustment for case reserve strengthening, using the the Berquist-Sherman adjustment for a change in case adequacy.

(d) (*1 point*) Calculate the AY 2022 ultimate claims.

9.

Provide the response for this question in the Excel spreadsheet.

(*5.5 points*) You are estimating ultimate claims for reserving purposes as of December 31, 2024 for the following two lines of business:

Line of Business A:

- Long-tailed line of business that has historically been stable, except for a significant change in case adequacy two calendar years ago.

Line of Business B:

- Short-tailed line of business that has historically been stable, except for a significant change in claim settlement patterns in the most recent calendar year.

(a) (*1 point*) Recommend an approach to estimate accident year (AY) 2024 ultimate claims for line of business A. Justify your recommendation.

(b) (*1 point*) Recommend an approach to estimate AY 2024 ultimate claims for line of business B. Justify your recommendation.

You are also estimating ultimate claims for line of business C using a Generalized Cape Cod method. Line of business C is a medium-tailed line of business (no development after 7 years) with stable exposures and minimal claim volatility.

(c) (*0.5 points*) Describe one reason why a low decay factor would be appropriate for line of business C.

You are given:

Accident Year (AY)	Earned Premiums	On-Level Factors	Reported Claims	Reported Age-to-Ultimate Dev. Factors
2019	12,473,287	1.062	7,560,927	1.048
2020	12,786,083	1.059	7,787,844	1.097
2021	13,207,605	1.040	7,690,156	1.191
2022	13,313,925	1.029	7,409,520	1.347
2023	13,723,913	1.023	6,527,570	1.636
2024	14,293,872	1.000	5,514,933	2.185

9. Continued

- The annual pure premium trend is 5.5%.
- The decay factor is 50%.

(d) (*2 points*) Calculate the ***AY 2020*** expected claim ratio adjusted to the 2024 level using the Generalized Cape Cod method.

The ***AY 2023*** expected claim ratio adjusted to the 2024 level using the Generalized Cape Cod method is 80.6%.

(e) (*1 point*) Calculate the ***AY 2023*** ultimate claims using the Generalized Cape Cod method.

10.

Provide the response for this question in the Excel spreadsheet.

(*4 points*) You are estimating ultimate ALAE for a line of business using a blended method. Blended methods are methods that are a blend of the development and expected methods.

(a) (*1 point*) Describe two advantages that blended methods provide when evaluating and selecting estimates of ultimate claims.

You are given:

Accident Year	Ultimate Claims Excluding ALAE	Reported ALAE to Reported Claims Ratios	Ultimate Reported ALAE to Reported Claims Ratios from Development Method
2020	8,546,310	0.155	0.160
2021	9,155,350	0.147	0.159
2022	9,982,850	0.129	0.154
2023	10,678,820	0.109	0.151
2024	12,047,950	0.085	0.147

- The a priori ratio of ultimate ALAE to ultimate claims is 0.120.

(b) (*1 point*) Calculate the ultimate ALAE for all accident years using the Bornhuetter Ferguson method.

(c) (*0.5 points*) Calculate the ultimate ALAE for all accident years using 1 iteration of the Benktander method.

An alternative way to estimate ultimate ALAE is to include ALAE with claims and use the development method.

(d) (*1.5 points*) Explain whether this alternative approach would give a higher or lower value than the estimate of ultimate ALAE determined in part (b).

11.

Provide the response for this question in the Excel spreadsheet.

(*4 points*) You are evaluating fixed expense ratios to premiums for a ratemaking exercise.

(a) (*1 point*) Describe whether a separate trending process might be needed for fixed expenses for the following exposures:

(i) Payroll

(ii) Number of vehicles

You are given:

Accident Year	Earned Exposures	Earned Premiums at Current Rate Levels	Fixed Expenses
2019	9,550	12,294,228	639,300
2020	9,960	12,673,073	663,822
2021	10,175	13,084,046	690,713
2022	10,561	13,648,648	719,171
2023	10,846	13,890,533	747,907
2024	11,120	14,508,539	778,816

(b) (*1.5 points*) Recommend an annual premium trend for this line of business. Justify your recommendation.

You are also given:

- The annual fixed expense trend is 1.0%.
- The trending period for accident year 2024 is 1.75 years.

(c) (*1.5 points*) Calculate the trended fixed expense ratios to premiums for all accident years.

****END OF EXAMINATION****