

Exam GHFVU

Date: Wednesday, May 4, 2022

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 12 questions numbered 1 through 12 with a total of 100 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.

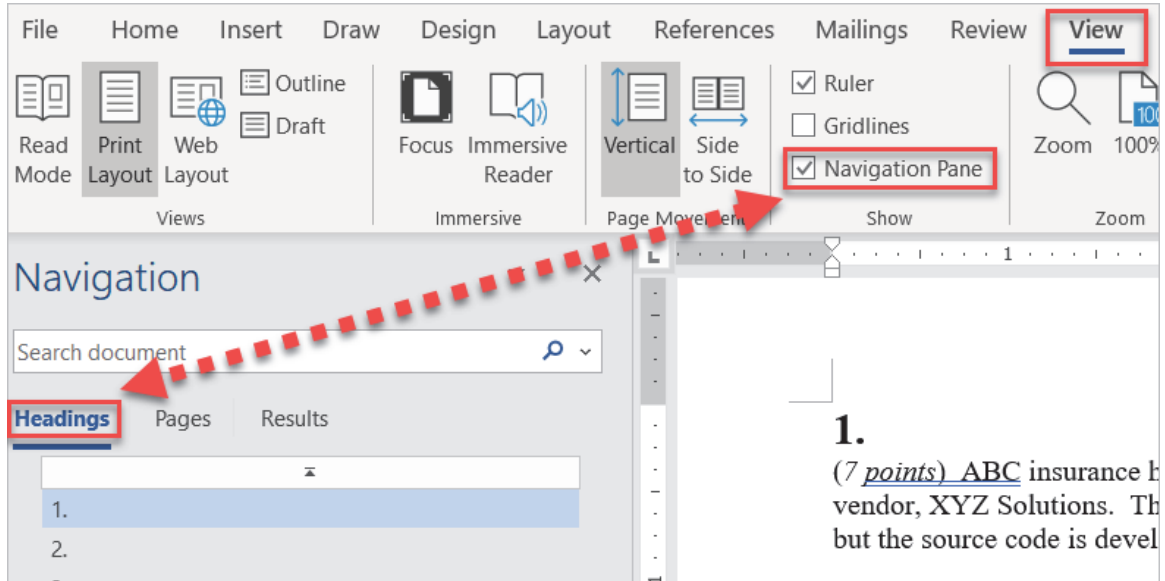
Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.
 - a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1 (and ^ used to indicate a superscript).
 - b) In the Excel document formulas should be entered. 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.
 - c) Individual exams may provide additional directions that apply throughout the exam or to individual items.
2. The answer should be confined to the question as set.
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before time expires.

Navigation Instructions

Open the Navigation Pane to jump to questions.

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



1.

(8 points) You are the consulting valuation actuary for Randolph Health Insurance (RHI).

- (a) (1 point) Describe the considerations regarding the quality of data to be used for reserving according to Actuarial Standard of Practice No. 23.

ANSWER:

- (b) (1 point) Describe the considerations when setting initial lag factors for the age-to-age development method.

ANSWER:

In the Excel file, you are provided with RHI's cumulative paid claims by incurred month from January 2019 through December 2021 and member count for each month.

The CEO has asked you to provide an IBNR estimate as of 12/31/2021 with the following information and assumptions:

- Use the smoothed age-to-age factors by applying the averaging technique using the most recent six months of claims data and assuming all claims complete after 12 months
 - Use the projection method to replace the incurred claim estimates for months where the completion factors are less than 30%
 - Trend rate is 10% per annum.
 - Use the January 2019-December 2020 experience period to develop the PMPMs.
- (c) (6 points) Calculate the IBNR estimate as of 12/31/2021. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

2.

(8 points)

- (a) (3 points) You are an actuarial manager at a Long Term Disability (LTD) insurer. You receive the following email from your direct report.

Hi, I was asked to help calculate the pending reserve for one of our members, age 40. We were informed of the claim one month after the end of the three-month elimination period. This member has a \$1000 monthly benefit payable for six months. I used our normal assumptions (interest rate at 4%, pending factor of 60%) and came up with a pending reserve of \$2747.27. Can you help review this to make sure I'm coming up with the correct answer?

- (i) Critique the accuracy of your direct report's calculated pending reserve using your own estimate from the continuance table provided. Show your work.

Claim Duration (months)	Age 40 at Claim
0	1000
1	960
2	920
3	880
4	845
5	815
6	790
7	765
8	745
9	725
10	0

The response for this part is to be provided in the Excel spreadsheet.

2. Continued

You receive a follow-up email from your direct report.

Hi, it turns out I had it backwards on when we were informed of the claim. Rather than one month after the end of the elimination period, it's supposed to be one month before the end of the elimination period. Sorry about that!

- (ii) Evaluate how the pending reserves may change based on the follow-up email.

ANSWER:

Your direct report has put together the table below listing considerations for each of short and long term reserves.

Consideration	Long Term Reserves	Short Term Reserves
1. Seasonality	X	
2. Internal staff practices		X
3. Economic conditions	X	
4. Claim Expenses	X	
5. Reserve cells	X	
6. Policy provisions	X	X
7. Data integrity		X
8. Insurance characteristics	X	

- (b) (4 points)

- (i) (2 points) Describe each consideration listed in the table above.:

ANSWER:

- (ii) (2 points) Critique the accuracy of each row in the table above.

ANSWER:

- (c) (1 point) List and describe considerations of short term and long term reserves not identified above.

ANSWER:

3.

(7 points) You are the valuation actuary for a Canadian insurer specializing in Group health and disability.

- (a) (2 points) Describe challenges facing actuaries valuing Group health and disability business.

ANSWER:

- (b) (1 point)

- (i) Define the Canadian Asset Liability Method (CALM).

ANSWER:

- (ii) Explain the link between CALM policy liabilities and the accounting value of the supporting assets.

ANSWER:

- (c) (1 point) List factors to consider for setting termination rate assumptions for Group Long Term Disability (LTD).

ANSWER:

3. Continued

You are given the following information on your block of Group LTD policies:

Claim duration	Reserve at 2021-01-01	Actual 2021 payments	Reserve at 2021-12-31
11	281,000	48,000	241,000
10	71,000	13,000	62,000
9	79,000	15,000	67,000
8	83,000	16,000	73,000
7	94,000	19,000	80,000
6	113,000	18,000	99,000
5	120,000	16,000	102,000
4	135,000	18,000	117,000
3	169,000	23,000	146,000
2	218,000	38,000	172,000
1	285,000	60,000	219,000
Current year	n/a	23,000	400,000

- The valuation interest rate is 2%
- Payments occur at the midpoint of the year.

(d) (2 points) Calculate the gain/loss by duration and in total. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(e) (1 point) Assess the adequacy of the reserve as of 2021-12-31. Justify your answer.

ANSWER:

4.

(7 points) You are the lead reserving actuary at Family Insurance Company (FIC), a small health insurance company whose primary market is selling Affordable Care Act (ACA)-compliant insurance.

Recently, a new type of head lice has emerged which causes more severe reactions due to secondary infections. Most kids infected need to be treated with antibiotics, while a few have also required hospitalization. Unfortunately, there is no treatment to stop the spread of these lice, and schools across the country have switched to remote learning. As a result, many parents have also been required to switch to working from home.

- (a) (1 point) Describe three different ways to incorporate conservatism into Incurred But Not Reported (IBNR) estimates.

ANSWER:

- (b) (1 point) Recommend which method from (a) FIC should use for the ACA business. Justify your answer.

ANSWER:

Your team has compiled the following information about the ACA business.

	Year 1	Year 2	Year 3
Premium PMPM	\$598	\$600	\$626
Claims PMPM	\$481	\$540	\$513
Marketing Expense PMPM	\$55	\$50	\$52
Claims Department Expense PMPM	\$15	\$25	\$26
FIC's Salaries	\$47,640,000	\$60,150,000	\$67,080,000
Discount Rate	0%	0%	0%
Number of Members	198,500	200,500	215,000

- (c) (1 point) Calculate the Premium Deficiency Reserve (PDR) that should be recorded at 12/31/Year 2. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

4. Continued

FIC also has a small block of Accident business which pays the policyholder a fixed amount if they are impacted by a covered accident.

- (d) (2 points) Recommend any conservatism FIC needs to include in each of the following reserves for the Accident business because of the lice outbreak. Justify your answer.

- (i) IBNR

ANSWER:

- (ii) Contract Reserves

ANSWER:

- (e) (2 points) Compare and contrast how this outbreak affects the reserves held for the ACA and Accident blocks of business.

ANSWER:

5.

(10 points)

- (a) (1 point) Describe the basic components of Embedded Value (EV).

ANSWER:

- (b) (2 points) Describe the main types of assumptions used in EV calculations.

ANSWER:

Your team has presented you with the following information on an acquisition target:

- Annual Premiums: \$12,000,000
- Assumptions
 - Estimated renewal increase per year: 6%
 - Expected lapses per year: 12%
 - Minimum Continuing Capital and Surplus Requirement (MCCSR) factor is 12% and current fluctuation factor is 75%
 - Capital Target: 175%
 - Expected Earnings on Capital: 5% (pre-tax)
 - Tax Rate: 40%
 - Premiums are paid at the beginning of the year
 - Lapses occurred at end of the year
 - Target post-tax profit: 14.0%
 - Discount rate per year: 10.5%

You have asked your team to produce an EV calculation to estimate what you may be willing to pay for the business. Your team has provided you with their EV calculation with a value of \$275,000 based on a 10 year projection.

- (c) (4 points) Assess the EV figure provided by your team. State any assumptions and show your work.

The response for this part is to be provided in the Excel spreadsheet.

5. Continued

You review the EV work and assumptions and write a report that you believe is a fair appraisal of the value of the acquisition target.

- (d) (2 points) List the items an actuary should disclose in an appraisal report according to ASOP 19.

ANSWER:

Your present the results to the Board of Directors, however, they believe the transaction is riskier than you have presented.

- (e) (1 point) Propose a change in your assumptions that would take into consideration the Board of Directors' concern. Justify your answer.

ANSWER:

6.

(6 points) With respect to the Medicare Advantage (MA) bidding process:

- (a) (1 point) Describe the financial aspects of the plan bid amount.

ANSWER:

- (b) (2 points) Describe how the amount of the CMS benchmark impacts what a health plan can offer to a Medicare beneficiary, in comparison to the plan bid amount.

ANSWER:

You are given the following financial information used for the current bid year:

Expected PMPM amounts

Allowed cost of Part A and Part B benefits	\$1,050
Traditional Part A and Part B cost sharing	\$140
Proposed MA plan design cost sharing	\$88
Cost of proposed supplemental benefits	\$55
Administration cost	\$50
Required plan profit	\$30
CMS benchmark	\$1,000

- Average MA risk score used in developing these cost estimates 1.1
- CMS rebate percentage for the contract 65%

- (c) (3 points) Calculate the PMPM amount available to the health plan to provide additional benefits to the beneficiary. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

7.

(7 points) Your Company's product area has been asked to put together creative plan designs that would make the health plan stand out in the market. After an initial brainstorming session, the Product area has provided you with the following benefit design grid for review, with a particular focus on complying with the Mental Health Parity and Addiction Equity Act (MHPAEA) on the Mental Health/Substance Abuse (MHSA) benefit levels.

Benefit Category	In- Network Benefit	OON Benefit
Inpatient	General: \$200 deductible for 1st 5 days. 80% coinsurance after.	General: \$1000 deductible for 1st 5 days. 60% coinsurance after.
	Teaching Hospital: \$250 deductible for 1st 5 days. 80% coinsurance after	Teaching Hospital: \$1500 deductible for 1st 5 days. 60% coinsurance after
	MHSA: \$200 deductible for 1st 5 days. 80% coinsurance after.	MHSA: \$1000 deductible for 1st 5 days. 80% coinsurance after. Limit to 10 days per visit.
	Pregnancy 100% coinsurance	Pregnancy: 35% coinsurance
Outpatient Surgery	\$200 copay	\$500 copay
Outpatient Office Visit - Generalist	\$25 copay in Utah \$30 copay in all other states	60% coinsurance
Outpatient Office Visit - Specialist	\$40 copay in Utah \$50 copay in all other states	60% coinsurance
Outpatient MHSA Office Visit - Generalist	\$20 copay in Utah \$30 in all other states	50% coinsurance
Outpatient MHSA Office Visit - Specialist	\$45 copay in Utah \$50 copay in all other states	50% coinsurance
Emergency Care	Accident Related Visits: \$100 copay MHSA Related Visits: \$400 copay All other Visits: \$400 copay	Accident Related Visits: \$100 copay MHSA Related Visits: \$400 copay All other Visits: \$400 copay
Pharmacy Requirement	All prescribed drugs must be within Company formulary to be covered. All Pain Management and MHSA drugs must be purchased through the Company mail order pharmacy or a 10% surcharge will apply to the copay.	
Pharmacy Brand - Pain Management	\$35 copay	
Pharmacy Generic - Pain Management	\$0 copay	
Pharmacy Brand - MHSA	\$35 copay	
Pharmacy Generic - MHSA	\$0 copay	
Pharmacy Brand - excluding Pain Management & MHSA	\$40 copay	
Pharmacy Generic - excluding Pain Management & MHSA	\$10 copay	

7. Continued

(a) (2 points)

- (i) (1 point) Identify the features of the proposed plan that are not in compliance with the MHPAEA.

ANSWER:

- (ii) (1 point) Recommend changes to the proposed plan to bring the design into compliance with the MHPAEA. Justify your recommendation.

ANSWER:

7. Continued

Your company is looking to change the Mental Health Office Visit benefit design for your Bronze level Affordable Care Act (ACA) plans. Currently, you offer the following two plans:

ACA Plan	Actuarial Value (AV)	Copay (Mental health)	Proposed Copay (Mental health)
Bronze 1	62.0%	\$40 per Visit	\$60 per Visit
Bronze 2	61.5%	\$40 per Visit	\$60 per Visit

When you enter this change into the Actuarial Value Calculator (AVC) from HHS, this results in a 5% decrease in AV. You believe this result is unreasonable because based on your company data, Mental Health Office visits have been, on average, no more than 6% of the total allowed costs by plan across your book of business.

Your analytics area provides you book of business data, across all lines of business including group, to determine a reasonable result.

Copay for Mental Health Office Visit	Util/1,000 Members for Mental Health Office Visit	Average Allowed Costs Per Mental Health Office Visit	Members with Benefit
\$30	400.5	\$703.47	21,750
\$35	365.2	\$739.84	10,880
\$40	310.6	\$770.22	16,310
\$45	320.0	\$672.09	10,880
\$50	266.9	\$729.21	14,140
\$55	224.0	\$764.76	3,810
\$60	193.2	\$786.50	26,100
\$65	136.5	\$594.78	3,260
\$70	71.0	\$719.95	1,630

7. Continued

(b) (5 points)

- (i) (1 point) Calculate a more reasonable result for the change in Actuarial Value. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

Your boss, who is a member of the American Academy of Actuaries, wants to utilize your AV change, not the AV change from the AVC.

- (ii) (4 points) Draft an actuarial communication documenting the difference between the AVs calculated by the AVC and using your actuarial judgement.

ANSWER:

8.

(10 points) You are an actuary at Arsenal Insurance Company (AIC).

- (a) (2 points) Compare and contrast the benefits for AIC of a provider incentive program versus a fee-for-service model.

ANSWER:

- (b) (2 points) Explain how two types of provider incentive programs are structured.

ANSWER:

You are given the following information:

- On 1/1/2021, AIC signs a provider incentive program with Diaby Ankle Rehabilitation Center (DARC) for the calendar year 2021.
- On 5/31/2021, AIC forecasts the full year payout of the program to DARC to be \$2.4M. AIC continues to accrue for this program at the same rate throughout the program year.
- On 12/31/2021, AIC and DARC determine the annual settlement is worth \$2.0M.

- (c) (2 points)

- (i) (1 point) Create the accounting entry for this program on May 31, 2021.

ANSWER:

- (ii) (1 point) Create the accounting entry for this program on December 31, 2021.

ANSWER:

8. Continued

In May 2022, DARC informs AIC that one of the quality metrics used to calculate the \$2.0M payment was incorrect, which caused an overpayment from AIC to DARC at Dec 31, 2021.

- (d) (2 points) Describe challenges associated with provider incentive programs for insurers.

ANSWER:

- (e) (2 points) Describe potential steps to address the challenges from part (d).

ANSWER:

9.

(11 points) You are the actuary tasked with company ABC's retiree group health plan valuation and have been provided with the information below.

Assumptions:

- Discount rate: 5.0% per annum
- Trend rate: 6.0% in year one, decreasing by 0.25% per year to an ultimate 4.0% rate
- Current annual claims cost per capita reflects individual coverage only
- Pre-retirement annual termination rate: 3% at every age
- Pre-retirement mortality rate: assumed 0%
- Retirement rate: assumed 100% at age 65
- Age 65 annuity factor (including trend and post-retirement mortality): 13

Plan Details:

- 100% Company paid
- No unamortized balances
- No plan assets

Active Employee and Retiree Data:

ID number	Status	Claims	Age	Years of Service
1341209	Active	\$3,055.00	40	5
1358335	Active	\$5,385.00	35	5
1358385	Active	\$3,076.00	50	20
1358468	Active	\$2,793.00	38	18
1358474	Active	\$3,673.00	42	12
1358535	Active	\$3,291.00	45	8
1358622	Active	\$1,074.00	55	25
1358650	Retiree	\$3,364.00	65	30
1358687	Retiree	\$2,666.00	66	40
1358754	Retiree	\$2,796.00	69	35
1358812	Retiree	\$4,132.00	72	25
1358842	Retiree	\$2,130.00	68	20

- (a) (4 points) Calculate the total aggregate APBO. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

9. Continued

Without access to a computer, your actuarial supervisor approximates the APBO by averaging costs, ages and years of service, resulting in a different APBO result that he believes will be “close enough.”

(b) (4 points)

- (i) (2 points) Calculate the difference between your detailed approach in part (a) and your supervisor’s approach. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

- (ii) (1 point) Explain the main drivers of the difference between your supervisor’s approximation and your calculation.

ANSWER:

- (iii) (1 point) Describe factors unaccounted for in your valuation that may still lead to your APBO calculation being overly simplistic.

ANSWER:

Your supervisor provides you with his calculation of the Net Periodic Postretirement Benefit Cost (NPPBC) using his simplified approach.

(c) (3 points)

- (i) (1 point) Explain the difference between the service cost and interest cost components of the NPPBC.

ANSWER:

- (ii) (2 points) Calculate the total aggregate NPPBC and the difference from your supervisor’s estimate. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

10.

(8 points) The state in which you live has only two insurance companies, Lion and Tiger. The only way for people to purchase insurance in your state is through their Affordable Care Act individual exchange.

The following data tables are made public by the Department of Insurance:

Number of People in Household	Federal Poverty Level (FPL)
1	\$12,760
2	\$17,240
3	\$21,720
4	\$26,200
Household Income as Percent of FPL	Maximum Premium as % of Household Income
Up to 133%	2.07%
133% up to 150%	3.10%
150% up to 200%	4.14%
200% up to 250%	6.52%
250% up to 300%	8.33%
300% up to 400%	9.83%
Age	Mandated Age Factor
25	0.67
30	0.73
35	0.83
40	1.00
45	1.17
50	1.33

10. Continued

Experience Year	Company	Exchange Plan	Allowed Medical Costs	Allowed Rx Costs	Average Number of Members	Plan Actuarial Value (AV)	Average Age
2018	Lion	Bronze	\$6,988,392	\$2,329,464	2,424	0.62	40
2019	Lion	Bronze	\$37,116,319	\$12,913,026	11,976	0.62	40
2018	Lion	Silver	\$88,387,200	\$29,462,400	26,400	0.72	40
2019	Lion	Silver	\$98,816,890	\$34,379,085	27,456	0.72	40
2018	Lion	Gold	\$27,374,922	\$9,124,974	7,452	0.79	40
2019	Lion	Gold	\$26,482,078	\$9,213,300	6,706	0.79	40
2018	Tiger	Bronze	\$113,549	\$26,635	36	0.59	35
2019	Tiger	Bronze	\$162,754	\$39,846	48	0.59	35
2018	Tiger	Silver	\$134,719,200	\$31,600,800	36,000	0.7	35
2019	Tiger	Silver	\$150,616,066	\$36,874,342	37,440	0.7	35
2018	Tiger	Gold	\$490,977	\$115,167	112	0.82	35
2019	Tiger	Gold	\$584,350	\$143,063	124	0.82	35

- Medical trend for both companies is 7% annually from 2018 to 2022
- Pharmacy Trend for both companies is 13% annually from 2018 to 2022
- AVs for 2022 for each plan are equal to 2019.
- Both companies price with an expected 80% loss ratio on all plan levels.

You are also given the following information:

- Joe is a single 50-year-old man with an income of \$35,000.
- Carole is a 30-year-old woman with a husband and one child, and their household income is also \$35,000.
- Carole is the only member of her household applying for coverage and a premium tax credit.
- Note, the state expects insurers to use only the most recent complete year of data to develop Individual ACA rates.

10. Continued

(a) (5 points)

(i) (3.5 points) Calculate the Advance Premium Tax Credit (APTC) for each of Joe and Carole. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(ii) (1.5 points) Calculate the net monthly premiums for Joe and for Carole under each plan offered on the exchange. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

Instead of the rates above, both carriers decide to implement a "silver loading" strategy. Each carrier raises its age 25 silver premium by the same dollar amount PMPM and keeps its age factors the same.

(b) (3 points) Assess the directional impact of the silver loading on net monthly premium for each plan by filling out the chart below with "increase", "decrease", or "unchanged".

Directional Change in Net Monthly Premium	Lion Bronze	Lion Silver	Lion Gold	Tiger Bronze	Tiger Silver	Tiger Gold
Carole						
Joe						

ANSWER: *(provide answer in table above)*

11.

(11 points) You are an actuary at “Live Laugh Love” Insurance Company (LLL).

- (a) (1 point) Describe the ultimate test of reserve adequacy according to Statutory Accounting Principles (SAP).

ANSWER:

- (b) (1 point) Describe the purpose and implications of the test in part (a).

ANSWER:

You are given the following projected monthly claims at the start of the year.

Time Period	Projected Claims (Millions)
1/31/2021	\$14.0
2/28/2021	\$19.0
3/31/2021	\$17.0
4/30/2021	\$20.0
5/31/2021	\$18.0
6/30/2021	\$22.0
7/31/2021	\$15.0
8/31/2021	\$16.0
9/30/2021	\$12.0
10/31/2021	\$21.0
11/30/2021	\$27.0
12/31/2021	\$28.0

- Contract Reserves at 1/1/2021 = \$5.0M
- Expected monthly expenses = \$2.0M
- Monthly premium = \$20.0M
- Annual interest rate = 5.0%
- All payments are made at the end of the month.

- (c) (2 points) Calculate whether extra reserves, as of 1/1/2021, need to be recorded based on SAP. Show your work. Justify your answer.

The response for this part is to be provided in the Excel spreadsheet.

11. Continued

- (d) (3 points) Compare and contrast the test in part (a) with Generally Accepted Accounting Principles (GAAP) loss recognition testing.

ANSWER:

A new regulation is passed that requires all insurers to cover out-of-network emergency room visits at 100% for all customers. This is a significant benefit change that will materially impact costs.

- (e) (3 points) Recommend three methods of modifying the reserve factors that would be appropriate for GAAP reporting. Justify your recommendations.

ANSWER:

LLL is being financially audited and you have been designated the responding actuary.

- (f) (1 point) Describe what you should consider when responding to the request for information, as per ASOP 21.

ANSWER:

12.

(7 points) With respect to the Medicaid Part D program:

- (a) (2 points) Outline how a prescription drug plan (PDP) shares financial risk with CMS.

ANSWER:

- (b) (3 points) Explain the importance of estimating Part D settlements before the final true-up with CMS.

ANSWER:

You are provided the following information:

National average monthly Part D bid amount (PMPM)	\$48
Projected average reinsurance payments to PDPs, as a percentage of total payments received by PDPs	60%

- (c) (2 points) Calculate the monthly CMS direct subsidy payment (PMPM) to Part D plans. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

****END OF EXAMINATION****