18. (3.25 points)

Given the following claim experience:

Accident Half-Year	Reported Claim Counts Excluding Claims Closed with No Payment as of (months)					
	6	12	18	24	30	36
2014-1	3,700	3,515	3,508	3,504	3,504	3,504
2014-2	4,000	3,800	3,792	3,788	3,788	
2015-1	3,800	3,610	3,603	3,599		
2015-2	3,700	3,515	3,508			
2016-1	3,900	3,705				
2016-2	4,100					

Accident Half-Year	Reported Severity ($) Excluding Claims Closed with No Payment as of (months)					
	6	12	18	24	30	36
2014-1	4,600	4,637	4,614	4,609	4,609	4,609
2014-2	4,900	5,023	4,998	4,993	4,993	
2015-1	4,400	4,435	4,413	4,409		
2015-2	4,800	4,920	4,895			
2016-1	4,600	4,637				
2016-2	4,500					

- There is no development in counts or severity beyond 36 months.

a. (2.25 points)

Calculate ultimate claims for accident year 2016 using a frequency-severity technique.

b. (0.5 point)

Explain why the downward development observed in the claim count triangle in part a. above may occur.

c. (0.5 point)

Discuss a diagnostic that can be used to test for seasonality.

CONTINUED ON NEXT PAGE

QUESTION 18

TOTAL POINT VALUE: 3.25 | **LEARNING OBJECTIVES: B2, B3**

SAMPLE ANSWERS

Part a: 2.25 points

Sample 1

Reported Claim Count Age to Age

	6-12	12-18	18-24	24-30	30-36
2014-1	.95	.998	.999	1.0	1.0
2014-2	.95	.998	.999	1.0	
2015-1	.95	.998	.999		
2015-2	.95	.998			
2016-1	.95				
Selected	.95	.998	.999	1.0	1.0
CDF	.947	.997	.999	1.0	1.0

Severity Age to Age

	6-12	12-18	18-24	24-30	30-36
2014-1	1.008	.998	.999	1.0	1.0
2014-2	1.025	.998	.999	1.0	
2015-1	1.008	.998	.999		
2015-2	1.025	.998			
2016-1	1.008				
1st half sel	1.008	.995	.999	1.0	1.0
1st half CDF	1.002	.994	.999	1.0	1.0
2nd half sel	1.025	.995	.999	1.0	1.0
2nd half CDF	1.01885	.994	.999	1.0	1.0

201601 = 3705 x .997 x 4637 x .994 = 17,025,773
201602 = 4100 x .947 x 4500 x 1.01885 = 17,801,500
Total = 34,827,273

Sample 2

CC

AHY	6-12	12-18	18-24	24-30	30-36	
14-1	3515/3700 = .95	.998	.999	1.00	1.00	
14-2	.95	.998	.999	1.00		
15-1	.95	.998	.999			
15-2	.95	.998				
16-1	.95					
						Tail
Selected	.95	.998	.999	1.00	1.00	1.00
Cumul	.947	.997	.999	1.00	1.00	1.00

AHY	Rept Claim Cnt	CDF	Ult CC
2016-1	3705	.997	3694
2016-2	4100	.947	3883

Sev

AHY	6-12	12-18	18-24	24-30	30-36	
14-1	4651/4600 = 1.008	.995	.999	1.00	1.00	
14-2	1.025	.995	.999	1.00		
15-1	1.008	.995	.999			
15-2	1.025	.995				
16-1	1.008					
						Tail
H1 selected	1.008	.995	.999	1.00	1.00	1.00
H1 cumul	1.002	.994	.999	1.00	1.00	1.00
H2 selected	1.025	.995	.999	1.00	1.00	1.00
H2 cumul	1.019	.994	.999	1.00	1.00	1.00

AHY	Rept Sev	Ult Sev	Ult CC	Ult Claims
2016-1	3705	4609	3694	17025646
2016-2	4100	4586	3883	17807438
				34833084

Sample 3

Rptd Claim Counts – Dev Factors

AHY	6	12	18	24	30
2014-1	.95	.998	.999	1.00	1.00
2014-2	.95	.998	.999	1.00	
2015-1	.95	.998	.999		
2015-2	.95	.998			
2016-1	.95				
Sel	.95	.998	.999	1.00	1.00
CDF	.9472	.997	.999	1.00	1.00

AHY	Ult Counts
2016-1	3705(.997) = 3694
2016-2	4100(.9472) = 3884

Rptd Sev – Dev Factors

First Half	6	12	18	24	30
2014	1.008	.995	.999	1.0	1.0
2015	1.008	.995	.999		
2016	1.008				
Sel	1.008	.995	.999	1.0	1.0
CDF	1.002	.994	.999	1.0	1.0

Rptd Sev – Dev Factors

Second Half	6	12	18	24	30
2014	1.025	.995	.999	1.0	1.0
2015	1.025	.995	.999		
Sel	1.025	.995	.999	1.0	1.0
CDF	1.019	.994	.999	1.0	1.0

AHY	Ult Sev
2016-1	4637(.994) = 4609
2016-2	4500(1.019) = 4586

AY 2016 Ult Claims = 3694(4609) + 3884(4586)
= 34,837,670

Part b: 0.5 point

Sample 1
Since claim counts exclude claims closed with no payment, a claim that is reported early on that ultimately has no payment is removed from the claim counts so there is a decrease in number of claims.

Sample 2
Due to the exclusion of claims closed w/o pay. These will be in triangle when open, but will fall out when they close, thus showing downward dev.

Sample 3
Reported claim counts exclude claims closed with no payments. As long as some claims are opened and then closed without payment, and those claim counts are more than incremental new claim counts, downward dev would happen.

Part c: 0.5 point

Sample 1
To test for seasonality, evaluate closed to reported claim counts at half years. The ratios will be lower in seasons with slower claim payment & higher with faster claim payment.

Sample 2
Diagnostic that can test seasonality is implied frequency. For example claim/exposure, may be frequent increase during the winter months because of weather conditions and decrease during summer months. This could be seen with frequency over time.

Sample 3
A diagnostic can be a tringle of monthly or quarterly reported claim counts % of AY total reported claim counts to see if some months or quarters see a higher percentage than others.

Sample 4
Reported to closed counts – should increase during the "in season times". For example, for boat owners coverage, more claims will be reported during the seasonal times when boats are in use and expect claims to close at a consistent rate.

EXAMINER'S REPORT

Candidates were expected to demonstrate knowledge regarding development techniques, recognition of seasonality in data, and calculation of ultimate claims as the product of ultimate claim counts times ultimate severity. Candidates were expected to explain the downward development observed in the given claim count triangle. Candidates were also expected to discuss a diagnostic that could be used to test for seasonality.

A common mistake included failing to recognize and reflect the seasonality of the given severity data in their calculations.

Part a

Candidates were expected to calculate ultimate claims for accident year 2016 by multiplying ultimate claim counts times ultimate severity, and summing across each of the 2016 accident half-years.

Ultimate claim counts for each accident half-year can be calculated through application of the chain ladder method on the given reported claim count triangle.

Ultimate severity can be calculated through application of the chain ladder method on the given reported severity triangle. Given that the data was on an accident half-year basis, candidates were expected to recognize the seasonal differences in severity development for the first half of an accident year compared to the second half, and to select separate development patterns for projecting half year severities to ultimate in order to reflect this. Selecting a single development pattern by taking a straight average of severity development factors across all accident half-years would not be appropriate, as this would fail to reflect the seasonality of the data in the ultimate projections.

Common errors included:

- Selecting a single development pattern for severity and applying it to all accident half-years, as opposed to selecting different development patterns for the first half and second half of an accident year in order to reflect seasonal differences.
- Summing the ultimate claim counts and summing the ultimate severities for each of the 2016 accident half-years, and calculating ultimate claims as the product of the two. Since severity is an average, summing the first half and second half severities to obtain the severity for the full accident year is not appropriate. This essentially double-counts the severity, resulting in ultimate claims that are drastically overstated.
- Calculating ultimate claims for only a half accident-year for 2016, as opposed to for both accident half-years and then summing to obtain the 2016 total.
- Using the age 6 reported claim count and reported severity paired with 6-ult cumulative development factors in projection of ultimate for accident half year 2016-1. Age 12 amounts and 12-ult development patterns should have been used.

Part b

Candidates were expected to recognize that the reported count triangle excluded claims closed without payment. Candidates should have explained how these types of claims would be present in the reported count at earlier maturities, but as time progressed, these claims would drop from the reported count, causing downward development.

A common mistake included discussing causes of downward development in claims, rather than claim counts, such as case reductions or salvage.

Part c

Candidates were expected to discuss a diagnostic that can be used to test for seasonality. Candidates should have provided a diagnostic that would be relevant for such testing, including discussion on finer levels of data aggregation than annual (i.e. monthly, quarterly, semi-annually), in addition to how the diagnostic should be applied and interpreted.

Common errors included:

- Providing example diagnostics that would not adequately identify seasonality
- Failing to highlight that diagnostics must be on a basis more granular than annual
- Simply stating a diagnostic but providing no discussion