23. (2.25 points)

Given the following information for an insurance company as of December 31, 2016:

Accident	Incremental Closed Claim Counts as of (months)			
Year	48	60	72	84
2010	60	25	15	5
2011	60	30	15	
2012	100	25		
2013	80			

Accident	Incremental Paid Claims ($000) as of (months)			
Year	48	60	72	84
2010	1,400	2,500	2,000	400
2011	1,600	1,100	600	
2012	2,800	1,900		
2013	2,100			

- Selected annual severity trend = 5%.
- Trended tail severity at 72 months at the accident year 2016 cost level = $114,000.
- Trended tail severity at 84 months at the accident year 2016 cost level = $107,000.

a. (1.5 points)

Calculate the trended tail severities at maturity ages 48 months and 60 months at the accident year 2016 cost level.

b. (0.75 point)

Discuss at which maturity age the data should be combined for the purpose of selecting an incremental tail severity to be used in a frequency-severity method for this insurance company.

QUESTION 23	
TOTAL POINT VALUE: 2.25	**LEARNING OBJECTIVE(S): B3**
SAMPLE ANSWERS	
Part a: 1.5 point	

Sample 1

Trended Tail Severity @ 48 Months:

∑ trended incremental paid claims 48+ / ∑ incremental closed claim counts 48+

Numerator: $(1,400 + 2,500 + 2,000 + 400) \times (1.05)^6 + (1,600 + 1,100 + 600) \times (1.05)^5 + (2,800 + 1,900) \times (1.05)^4 + (2,100) \times (1.05)^3 = 20,798.22$

Denominator: $(60 + 25 + 15 + 5) + (60 + 30 + 15) + (100 + 25) + (80) = 415$

Trended Tail Severity @ 48 Months = 20,798.22 x 1000 / 415 = **$50,116.**

Trended Tail Severity @ 60 Months:
Numerator: $(2,500 + 2,000 + 400) \times (1.05)^6 + (1,100 + 600) \times (1.05)^5 + (1,900) \times (1.05)^4 = 11,045.61$

Denominator: $(25 + 15 + 5) + (30 + 15) + (25) = 115$

Trended Tail Severity @ 60 Months = (11,045.61) x 1,000 / 115 = **$96,049.**

Sample 2
Trended Tail Severity @ 60 Months:

Use tail severity @ 72.

$[2,500 \times 1.05^6 + 1,100 \times 1.05^5 + 1,900 \times 1.05^4 + (114,000) \times (15 + 15+ 5)] / [25 + 30 + 25 + 15 + 15 + 5]$ = **$96,118.**

Trended Tail Severity @ 48 Months:
$[1,400 \times 1.05^6 + 1,600 \times 1.05^5 + 2,800 \times 1.05^4 + 2,100 \times 1.05^3 + 96.118 \times (115)] / (60 + 60 + 100 + 80 + 115)$ = **$50,135.**

Sample 3
Incremental Severities

AY	48	60	72	84
2010	23.33	100.00	133.33	80.00
2011	26.67	36.67	40.00	
2012	28.00	76.00		
2013	26.25			

Trended Incremental Severities

AY	48	60	72	84
2010	31.27	134.01	178.68	107.21
2011	34.03	46.80	51.05	
2012	34.03	92.38		
2013	30.39			

Maturity Sum of Trended Incremental Paid

48	9,753	=31.27 x 60 + 34.03 x 60 + 34.03 x 100 + 30.39 x 80
60	7,064	
72	3,446	
84	536	

48	20,798	415	**@48: $50.12**
60	11,046	115	**@60: $96.05**

Part b: 0.75 point

Sample 1

The 48 month incremental claims closed is very high, so the 48 month frequencies and severities appear stable enough to be predictable. In other words, it is best to leave these out of the tail severity calculation so that they can help provide one more data point of development before the tail. The 60-month severities are not credible/stable to provide development information, which is why I would include that in my tail severity instead. This will also increase the volume and stability of the tail.

Sample 2

Trended Incremental Severities

AY	48	60	72	84
2010	31	134	179	107
2011	34	47	51	
2012	34	92		
2013	30			

As calculated in (a) above, the incremental severities are stable at 48. Since there is valuable information here, we should use it. Severities start becoming erratic/jumpy at 60+, so combine here.

Sample 3

There is still a significant amount of claim volume and closed claims in the maturities prior to age 72, so this information is credible and we should use the actual severities in the frequency/severity calculation. At age 72, we have very low claim counts in this maturity and the data is starting to become erratic (i.e., there is a decrease in trended tail severity from 72 to 84 months). Therefore, I would combine at ages 72 and above.

EXAMINER'S REPORT

Candidates were expected to be familiar with the tail severity concept, how to calculate this metric, and to understand at what age data should be combined for the purposes of selecting an incremental tail severity.

Part a

Candidates were expected to calculate the incremental tail severities at 48 and 60 months.

Common errors included:
- Calculating a simple or claim-weighted average severity using only data at age 48 and 60 months
- Calculating the 48 tail severity as the sum of data at 60+ maturity and 60 tail severity as sum of data from 72+ maturity
- Incorporating both the 72 and 84 tail severities into the calculation
- Trending mistakes such as trending data to 2013 (not 2016) or applying trend across accident years at the same maturity (instead of all maturities for the same accident year)

Part b

Candidates were expected to select an appropriate age to combine the data for purposes of selecting an incremental tail severities as well as provide the rationale using company specific data. Candidates should compare and contrast the age before and after their selection.

Common errors included:
- Providing general considerations for when to select a tail, but without providing the actual selection for this company or considering any company specific information
- Selecting the wrong age (48 or 84 are not appropriate)
- Not noticing the stability in severities at age 48