16. (2 points)

Given the following information:

Accident	Reported Claim Counts (excluding closed with no payment)		
Year	12 Months	24 Months	36 Months
2010	291	274	273
2011	301	289	
2012	254		

Accident	Reported Claims ($000)		
Year	12 Months	24 Months	36 Months
2010	$11,058	$12,330	$12,375
2011	$11,739	$13,005	
2012	$13,970		

Assume no further development after 36 months.

Using a frequency-severity technique, estimate the IBNR for all accident years.

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Exam 5 – Question #16 (example 1)

Cumulative Severity Triangle

AY	12	24	36
10	38,000	45,000	45,330
11	39,000	45,000	
12	55,000		

Age-to-age sev.

AY	12-24	24-36
10	1.184	1.007
11	1.154	
Selected (avg)	1.169	1.007

Age-to-Ult. Selections

12-ult.	24-ult.	36-ult.
1.177	1.007	1.000

Claim Count Age-to-Age

AY	12-24	24-36
10	.942	.996
11	.960	
Selected (avg)	.951	.996

Claim count Age-to-Ult. Selections

12-ult	24-ult	36-ult
.947	.996	1.000

AY	(1) Claim Count	(2) Reptd Severity	(3) Ult Claim Count	(4) Ult Sever.	(5) Ult. Loss	(6) Reported loss	(7) IBNR
10	273	45,330	273	45,330	12,375	12,375	0
11	289	45,000	288	45,313	13,051	13,005	46,000
12	254	55,000	241	64,735	15,601	13,970	1,631,000
							1,677,000

(3) = (1) x Age to Ult

(4) = (2) x Age to Ult

(5) = (3) x (4)

(7) = (5) – (6)

Exam 5 – Question #16 (example 2)

Claim counts LDFs

AY	12-24	24-36
2010	1.942	1.483
2011	1.96	
LDFs	1.95	1.483
CDFs	2.892	1.483

Cum. Claim Counts

AY	12	24	36
2010	291	565	838
2011	301	590	
2012	254		

Cumulative Severity

AY	12	24	36
2010	38000	41395	42677
2011	39000	41939	
2012	55000		

Severity LDFs

AY	12-24	24-36
2010	1.089	1.031
2011	1.075	
LDFs	1.082	1.031
CDFs	1.1157	1.031

2011 ult. Counts = 590 x 1.483 = 874.97
2012 ult. Counts = 254 x 2.892 = 734.57

2011 ult. Severity = 41939 x 1.031 = 43239
2012 ult. Severity = 55000 x 1.1157 = 61363.5

2011/2012 ult. Loss = 874.97 x 43239 + 734.57 x 61363.5 = 82908614

IBNR = 82908614 – 38714000 = $44194614

Exam 5 – Question #16 (example 3)

Ult. Claims = frequency x severity = (ult. Claim counts) x (ult. Avg. severity)

Determine ult. Clm. Counts:

AY	12-24	24-36	36-ult.
10	.942	.996	1.00
11	.960		
Avg.:	.951	.996	1.00
CDF:	.947	.996	1.00

AY	Counts @ 12/31/12	Count CDF	Ult. Count
10	273	1.000	273
11	289	.996	288
12	254	.947	241

Determine avg. severities = rptclms/rptclm counts

AY	12	24	36	Ult. Sev.
10	38000	45000	45330	45330
11	39000	45000		45000(1.007)=45315
12	55000			55000(1.177)=64735

Avg. Sev. Link ratios

AY	12-24	24-36
10	1.184	1.007
11	1.154	
Avg.:	1.169	1.007
CDF	1.177	1.007

AY	Rpt clms (1)	Sev (2)	Ult claim counts (3)	Ult clms(4) = 2 x 3	IBNR (5) = 4-1
10	12375	45330	273	12,375,090	90
11	13005	45315	288	13,050,720	45,720
12	13970	64735	241	15,601,135	1,631,135

Total = 1,676,945

16.

Many candidates received full credit on this question. Full credit was given for considering the claims as either incremental or cumulative as long as both the counts and dollars were both used as either cumulative or incremental.

Many candidates knew very well how the method works but were short of getting full credit because they did not show the derivation of Ultimate Claim Counts and Ultimate Severities as two essential components of the method. In the majority of cases, when graders were able to follow the candidate's logic, the candidate still received the full credit for listing components of the Ultimate Claim Counts and Ultimate Severities.

Some common mistakes that were made on this problem:

- Reported Claim Counts and Reported Claims ($000) (a.k.a. Reported Losses) can be interpreted as Incremental or Cumulative but this interpretation should be consistent between both data triangles.
- Applying age-to-age factors (a.k.a. link ratios) instead of age-to-ultimate factors (a.k.a. cumulative development factors) to develop severity and claims count.
- Forgetting that the question asked about IBNR for all years and just calculate Ultimate Claims ($000).

17.

Candidates did well on this question. Full credit for this question was given for calculating ultimate losses instead of IBNR. Candidates could also receive full credit for making assumption about the amount of paid losses to then calculate IBNR.

a. A majority of the candidates received full credit on this part. Some candidates did apply the Bornhuetter-Ferguson method instead of the Benktander method, resulting in loss of some credit.

b. Roughly half of the candidates received full credit on this part. With high level of iterations, the result will converge to the development technique. If candidates did not know that they did not receive credit on this part.