22. (1.75 points)

The following information is available for accident year 2013 as of December 31, 2013:

- Selected ultimate claims = $5,000.
- Reported claims = $3,000.
- Selected cumulative development factor at 12 months = 6.67.
- Selected cumulative development factor at 24 months = 2.86.

a. (1.25 points)

Calculate cumulative expected reported claims as of July 31, 2014, using linear interpolation.

b. (0.5 point)

Describe why linear interpolation may not be appropriate for estimating the expected reported claims for an immature accident year.

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EXAM 5 FALL 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 22	
TOTAL POINT VALUE: 1.75	**LEARNING OBJECTIVE: B8**

SAMPLE ANSWERS

Part a: 1.25 points

Accepted Answer 1

% rpt at 12 months: 1 / 6.67 = 15%
% rpt at 24 months: 1 / 2.86 = 35%

At 7/31/2014, month of development = 19 months
% rpt at 19 months: 0.15 + (19-12) / (24-12) * (0.35 – 0.15) = 0.2667
% rpt at 19 months: 0.15 + 7/12 (0.35 – 0.15) = 0.2667
IBNR = 5000 – 3000 = 2000
Expected emergence from 12/31/2013 to 7/31/2014 = 2000 / (1-.15) * (0.2667 – 0.15) = 275
Reported claims at 7/31/2014 = 3000 + 275 = 3275

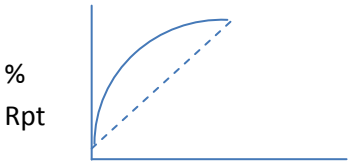
Accepted Answer 2

Expected emergence from 12 months to 24 months = (5000 – 3000) / (1-15%) * (35% - 15%) = 471
Using linear interpolation at 19 months = 7 / 12 * 471 = 275
Reported claims at 7/31/2014 = 3000 + 275 = 3275

Part b: 0.5 point

Linear interpolation assumes that claims developed evenly and uniformly throughout the period. Reasons this assumptions may not hold include:

- Additional claims being incurred as well as development on claims already reported as well as faster reported claims earlier in the year may cause the linear interpolation to underestimate the expected claims (e.g. seasonality)
- Highly leveraged development factors due to immature year
- Claim distribution is typically not a straight line, but rather a curve, similar to the following:



EXAMINER'S REPORT

Part a

Most candidates did well on this part. The candidate was expected to calculate (and demonstrate) their logic throughout the entire problem to obtain full credit.

Common errors included:

- Not realizing the question asked for projected values as 7/31/2014 and not 7/1/2014. This led to a wrong interpolation of the time frame.
- Determining the expected claims in the period 12/31/2013 to 7/31/2014, but failing to add the expected claims to the claims already reported at 12/31/2013.
- Coming up with a new ultimate claims amount by taking the reported claims and multiplying by the 12 to ultimate factor

Part b

Candidates generally did well on this question. The candidate was expected to understand and/or demonstrate that linear interpolation assumes uniform distribution throughout the year and give at least an example of why this assumption may not hold.

Common errors included:

- Stating insurance claims are not uniform, but not supporting the uniform argument by demonstrating understanding of the concept
- Using a restatement of the question as their answer