25. (1.5 points)

An actuary is using exposure rating to calculate increased limit factors for an auto liability treaty. The actuary has selected a severity distribution for the exposures being considered. The expected value function of losses capped at L is:

$$E[x; L] = 30 + 900(1 - ln(1000/L))$$

Additionally, the actuary has the following information:

- All of the ceding company's underlying policy limits are $1,000,000
- The reinsurance treaty attachment point is $250,000
- The reinsurance treaty limit is $750,000

a. (1 point)

    Calculate the exposure factor.

b. (0.5 point)

    Calculate the ground up expected loss if the estimated loss cost of the treaty layer is $243,500.

QUESTION 25

TOTAL POINT VALUE: 1.5 **LEARNING OBJECTIVE: C5**

SAMPLE ANSWERS

Part a: 1 point

Sample 1

(E[x;250K+750K] − E[x;250K])/E[x;1,000K] = (7146.98 − 5899.31)/7146.98 = 0.1746

Sample 2

Layer is 750K xs 250K
G(1) − G(0.25) = 1 − 5899.31/7146.98 = 0.1746

Part b: 0.5 point

Sample 1

(0.1746) * x = 243,500, therefore x=1.395M

Sample 2

Loss in layer = freq.* (E[X^1000] − E[X^250]) = 243,500
Ground up loss = freq. * (E[X^1000])
Freq. = 195.269
Ground up loss = 195.269*7146.98 = 1395.58K

EXAMINER'S REPORT

Part a

The candidates needed to know the exposure curve and finding the exposure factor based on the layers asked in the question.

Candidates generally scored well but there are some common mistakes:
- Selecting the wrong layers (ex. use the concept of ILFs instead of exposure curves)
- Plugging in values in thousands rather than in dollars into given formula, which causes exposure factors to be greater than 1
- Calculating the individual expected limited losses incorrectly

The vast majority of candidates conceptually knew what to do, but several had minor errors in execution

Part b

The candidates needed to know how to use the exposure factor calculated from part) a to set up the relationship between the ground up losses and losses in the layer.

There are some common mistakes, including:
- Not knowing the right formula to use
- Not knowing the relationship between the ground up losses and losses in the layer