15. (1.75 points)

A reinsurer has priced a quota share treaty to achieve an expected combined ratio of 90%. Expenses for the treaty are as follows:

Ceding Commission	20%
Brokerage Fees	5%
Administrative Expenses	1%
Unallocated Expenses	1%

The following table represents the expected loss ratio distribution for the primary insurer under the treaty:

Range of Loss Ratios	Average Ratio in Range	Probability of being in Range
0-40%	37.3%	0.03
40-60%	53.2%	0.21
60-80%	66.1%	0.55
80% or above	91.1%	0.21

The treaty includes a loss corridor from 60% to 80% loss ratio.

Calculate the percent of loss reassumed by the primary insurer in the loss corridor.

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SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 15	
TOTAL POINT VALUE: 1.75	**LEARNING OBJECTIVE(S): C4**

SAMPLE ANSWERS

Sample 1

No loss corridor the expected LR is
37.3×0.03 + 53.2× 0.21 + 66.1×0.55 + 91.1×0.21 = 67.777

With loss corridor, the expected LR is
0.9-0.2-0.05-0.01-0.01 = 0.63

So overall the loss corridor reassumes 67.777-63 = 4.777% of losses.

37.3 × 0.03 + 53.2 × 0.21 + (60 + 6.1x) × 0.55 + (60 + 20x + 11.1) × 0.21 = 0.63
x = 0.368
So the loss corridor reassumes 1 – 0.368 = 0.632.

Sample 2

Expected loss ratio – 90%-20%-5%-1%-1% = 63%
Expected primary insurer loss ratio = 37.3×0.03 + 53.2×0.21 + 66.1×0.55 + 91.1×0.21 = 67.777

x = insurance company reassumed

0.373×0.03 + 0.532×0.21 + [0.60+(1-x)(0661-0.6x)]×0.55 + [0.60+(1-x)(0.8-0.6)+(0.911-0.8)]×0.21 = 0.63
x = 63.2%

Sample 3

ELR_{WO} = 37.3×0.03 + 53.2×0.21 + 66.1×0.55 + 91.1×0.21 = 67.777

ELR_{with}=0.03×0.373 + 0.21×0.532 + 0.55(0.661-0.061x) + 0.21(0.911-0.2x) = 0.67777 – 0.075555x
= 90%- 5%-20%-1%-1% = 0.63
x = 63.23% is reassumed by the primary insurer.

Sample 4

Expected Combined ratio = expected loss ratio + expected commission + expense ratio = 90%
Expected loss ratio = 63%
Expected loss ratio minus assumed = 0.03×37.3% + 0.21×53.2% + 0.55×(66.1-6.1x) + 0.21(91.1-20x)
63% = 67.777 – 7.555x
4.777 = 7.555x
x = 63.2%

Sample 5

Primary reassumes x% of corridor losses

Range	Reassumed	P	E[reassumed]	Avg LR	E[LR]
1	0	0.03	0	37.3	1.1
2	0	0.21	0	53.2	11.2
3	6.1%x	0.55	0.03355x	66.1	36.4
4	0.2x	0.21	0.042x	91.1	19.1
			0.7555x		67.8

Combined Ratio = 90% = Avg LR – Reassumed + Expense = 67.8 – Reassumed +27
Reassumed = 4.8%

0.48 = 0.07555x
x = 63.5%

Sample 6

90% - 20% - 5% - 1% - 1% = 63%

(66.1%-60%)×0.55 + 20% × 0.21 = 7.56%
37.3×0.03 + 53.2× 0.21 + 66.1×0.55 + 91.1×0.21 = 67.78%
67.78% - 7.58% × X = 63%
X = 63.2%

Sample 7
Ceded ELR = 90-20-5-1-1 = 63%
E Tot LR = 37.3×0.03 + 53.2×0.21 + 66.1×0.55 + 91.1×0.21 = 67.78%
E assumed LR = 67.777% - 63% = 4.777%
(66.1-60)×.55 +20%×.21 = 7.55%
% assumed = 4.777%/7.555% = 63%

EXAMINER'S REPORT

Candidates were expected to be able to determine the effect of a loss corridor on the price of a reinsurance contract. The candidate was expected to calculate the target loss ratio including the loss corridor. At that point, the candidate could proceed in a few ways: either calculating the primary insurer expected loss ratio, calculating the loss in the corridor, and getting the needed loss ratio reduction, or calculating the loss percentage kept by the reinsurer and subtracting from 1.

Common mistakes included:

- Calculating the percentage kept by the reinsurer, and then not converting that to the percentage reassumed by the primary
- Calculating the expected loss ratio (including loss corridor) incorrectly, by assuming that some of the expenses were allocated by premium