9. (2 points)

An actuary is pricing an account that qualifies under a single-split experience rating plan. The account's actual losses during the experience rating period are:

Claim	Loss and ALAE
1	$8,000
2	21,000
3	3,000
4	11,500

The following information is also available:

Split point:	$10,000
Primary credibility:	0.80
Excess credibility:	0.20
Expected loss:	30,000
Loss-free modification:	0.60

Calculate the experience modification.

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EXAM 8 FALL 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 9

TOTAL POINT VALUE: 2

LEARNING OBJECTIVE: B1, B3

SAMPLE ANSWERS

Sample 1

$$Mod = \frac{ZpAp + ZeAe + (1 - Zp)Ep + (1 - Ze)Ee}{E}$$

Clm	Ap	Ae
1	8000	0
2	10000	11000
3	3000	0
4	10000	1500
Total	31000 = Ap	12500 = Ae

$$M_0 = \frac{(1 - Zp)Ep + (1 - Ze)Ee}{E} = 0.60$$

Substitute X for Ep and (30000-X) for Ee

0.60=[X(1-.80)+(30000-X)(1-.20)] /30000 ➔

18,000=0.2X + 24,000 – 0.8X ➔

-6,000 = -.6X ➔

X = 10,000 = Ep

Ee = 20,000

Now, we plug the figures into the M formula above:

$$M = \frac{0.8x31K + 0.2x12.5K + 0.2x10K + 0.8x20K}{30K} = 1.51$$

Sample 2

$$M = \frac{Ap + WAe + (1 - W)Ee + B}{E + B}$$

$$W = \frac{Ze}{Zp} = \frac{0.2}{0.8} = 0.25$$

$$Zp = \frac{E}{E+B}, so\ 0.8 = \frac{30000}{30000+B}, so\ B = 7500$$

$$0.6 = \frac{0+0+(1-0.25)Ee+7500}{30000+7500}$$

Ee=20,000

$$M = \frac{31000+0.25*12500+0.75*20000+7500}{30000+7500}$$

.

Sample 3

E(L)=30,000, so W=0.09 and B=17,500 from the Alabama tables.

$$0.6 = \frac{0+0+(1-0.09)Ee+17500}{30000+17500}$$

Ee=12,088

$$M = \frac{31000+0.09*12500+0.91*12088+17500}{30000+17500} = 1.276$$

EXAMINER'S REPORT

On the exam, the losses in the table are incorrectly labeled as "Loss and ALAE". This was unintentional, and it did not seem to impact many candidates' responses. A handful noted that this should be Loss only, and several tried to "remove" the ALAE.

No deductions were taken off for those candidates who attempted to remove the ALAE by a valid method. Some candidates attempted to remove the ALAE using the Loss Free Mod, which demonstrated a misunderstanding of a core concept of Gillam & Snader's study note. These candidates did not receive any direct deductions for this, however, they most likely did not receive full credit as they made other mistakes showing they did not have full command of the material.

The first sample solution was based on Gilliam and Snader I. Note, there is a shortcut, if you notice that the M formula can be rewritten like this:

$$M = \frac{ZpAp+ZeAe}{E} + \frac{[1-ZpEp-ZeEe]}{E} = \frac{ZpAp+ZeAe}{E} + \overline{M}$$

Candidates who recognized this, and therefore skipped the splitting of Ep and Ee, got full credit.

The second sample solution uses Perryman's equation, which is found in the NCCI manual. As with first sample solution, the M formula can be rewritten as:

$$M = \frac{Ap + WAe + (1-W)Ee + B}{E + B} = \frac{Ap + WAe}{E + B} + \frac{(1-W)Ee + B}{E + B} = \frac{Ap + WAe}{E + B} + \overline{M}$$

and a similar shortcut applied to receive full credit.

The third sample uses the NCCI manual to look up the W and B values for Alabama for 2011 (Pages E4 and E5, respectively), and proceed as in method 2 to derive Ee, and then M. This solution wasn't expected, as the problem does not indicate that it is an Alabama risk or that the actuary is using the NCCI plan. A few candidates selected the 2010 table; these candidates got credit despite selecting the outdated tables.

There were some candidates who did a combination of the 2nd and 3rd methods, calculating W from the 2nd method, and looking up B from the 3rd. Mixing the methods resulted in a loss of credit, as this produces an inconsistency among the inputs for the Mod formula.