16. (2.5 points)

An actuary has experience rated five policies and presented the resulting modification factors to the underwriter. The results are as follows:

Policy	Experience Mod Factor	Manual Premium	Losses
A	0.97	$40,000	$39,000
B	1.40	$10,000	$14,500
C	0.95	$25,000	$23,500
D	1.33	$15,000	$20,500
E	0.81	$45,000	$33,000

a. (0.5 point)

The underwriter targets Policies B and D and states they should not be written because they are undesirable risks. Evaluate the validity of this statement.

b. (1 point)

Calculate the experience rating off-balance for these five risks.

c. (1 point)

Assess whether the plan used to calculate the experience modification factors demonstrates premium equity.

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Question 16:

Model Solution 1

(1)	(2)	(3)=(2) x exp mod factor	(4)	(5)=(4)/(2)	(6)=(4)/(3)
Policy	Manual Premium	Standard Premium	Losses	Manual LR	Std LR
A	40,000	40,000(.97)=38,800	39,000	0.975	1.0052
B	10,000	10,000(1.4)=14,000	14,500	1.450	1.0357
C	25,000	25,000(.95)=23,750	23,500	0.940	0.9895
D	15,000	15,000(1.33)=19,950	20,500	1.367	1.0276
E	45,000	45,000(.81)=36,450	33,000	0.733	0.9053
Total	**135,000**	**132,950**			

a) The statement is somewhat valid, since these two risks have the highest standard loss ratios. However, the standard loss ratios aren't that much higher than the other policies. It's also possible that B and D are poor fits for their current classifications, so their mods might be under or overstated.

b) Off-balance=SP/MP=132,950/135,000=.9848

c)

Policy	Mod	Manual LR	Std LR
E	.81	0.7333	.9053
C	.95	.94	.9895
A	.97	0.975	1.0052
D	1.33	1.367	1.0276
B	1.40	1.45	1.0357

→ No, since the standard LR shows increasing trend as the mods increase, it means the plan is not responsive enough and does not demonstrate premium equity.

Model Solution 2

a) Debit mod doesn't mean risk is a bad risk.
If experience rating plan is designed appropriate, debit and credit risks are equally desirable.
Could just mean risk is a poor fit to manual classification but has good safety program.

Lastly, any loss is mostly pure chance.

b) Off-balance=standard premium/manual premium=132.95/135=.985

c)

Policy	Mod	Manual LR	Std LR
E	.81	.73	.905
C	.95	.94	.989
A	.97	0.975	1.005
D	1.33	1.367	1.028
B	1.40	1.45	1.036

Equity not achieved → credit risks performing better than debit risks as can be seen by increasing trend in the standard LR. Plan doesn't apply enough credibility

Model Solution 3, for part c only

Policy	Mod	Manual LR	Std LR
E	.81	.733	.905
C	.95	.94	.989
A	.97	0.975	1.005
D	1.33	1.36	1.028
B	1.40	1.45	1.036
	E(LR)	1.0916	0.9926
	E(LR^2)	1.265	0.9875
	V(LR)	0.0734	0.0022

Manual LR widely spread, positive trend → identifies risk
Std LR close to unity (except for mod 0.81), but has positive trend → not responsive enough
Test statistic=0.0022/0.0734 =0.03. Low test statistic is good.

Examiner's Comments:
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Candidates took two approaches to this question – qualitative and quantitative.

For the qualitative approach, full credit was given for 1) recognizing that the Underwriter was targeting policies B and D as undesirable because of their debit mods, and 2) stating that debit mods don't necessarily mean the risk is undesirable, rather the mod could mean that the risk was a poor fit in their classification or, if the

debit mod was due to poor loss performance, that any single loss could be a matter of pure chance.
For a quantitative approach, partial credit was given for calculating the Standard Loss Ratios for risks B and D and comparing those Loss Ratios to the rest of the risks. To get full credit, though, the candidate still needed to mention that the debit mod could mean that the risk was a poor fit in their classification, or if the debit mod was due to poor loss performance that any single loss could be a matter of pure chance.

About half the candidates received full credit on this part of the question.

Part b

For full credit, the candidate needed to produce the correct numerical answer. Most candidates did receive full credit on this part. Partial credit was given for calculating total Manual Premium, total Standard Premium, setting up the off-balance formula correctly, and correctly calculating the ratio based on the calculated Standard/Manual Premium results.

Part c

Most candidates correctly calculated the Standard Loss Ratios for all five policies. Additional credit was given for ranking risks by their mod and for recognizing the trend in Standard Loss Ratios in relation to mod and further recognizing that this trend is a result of too little credibility being assigned to the plan. Candidates could also receive partial credit by calculating a test statistic based on the variances of Standard and Manual Loss Ratios.

Some candidates split risks into only two groups (credit risks and debit risks), and calculated a Standard Loss Ratio for each group. These candidates received only partial credit.
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