Reading: Werner Appendix B: Homeowners
Model: Text Example
Problem Type: Pure Premium Rate Indication for Homeowners

Find Calculate the indicated rate given the following information:

Given

effective date	2026	7	1
	year	*month*	*day*

term	12	1
	months	*ren*

V: variable expense	15.0%
Q: profit provision	4.0%
E(F): fixed expenses	$ 55.00

<-- through 2024

historical loss trend	4.0%
projected loss trend	2.0%
fixed expense trend	3.0%
exposure trend	0.0%

non-modeled cat-to-AIY ratio	0.440
2024 reinsurance cost	55,000
2024 reinsurance recoveries	34,000

** assume the net per-exposure cost of reinsurance for the effective period is the same as for CY 2024*

* modeled cat pure premium	37.82

** projected*

CY	EE	non-cat rpt loss & ALAE	LDF	ULAE factor	AIY / EE exp fit
2020	790	241,300	1.00	1.030	261
2021	920	292,400	1.06	1.030	273
2022	990	325,100	1.10	1.030	286
2023	1,040	359,200	1.14	1.030	299
2024	1,050	421,300	1.19	1.030	313
2025					327
2026					**342**
2027					**358**

Step 1	projected……..	ultimate……..	non-cat……..	pure premium	=	440.27	
Step 2a	projected……..	non-modeled…	cat……..	pure premium	=	162.25	
Step 2b	projected……..	modeled……..	cat……..	pure premium	=	37.82	*(given)*
Step 3	projected……..	net……..	reins……..	pure premium	=	20.00	
Step 4	projected……..	fixed……..	expense……..	pure premium	=	59.22	
					total ====>	719.55	*<== final answer*

Step 1 calculate projected ultimate non-cat pure premium

	trend periods		non-cat ultimate	non-cat ultimate
	from CY to 2024	from 2024 to eff. per.	**LOSS**	**Pure Pr.**
2020	4	3	308,552	390.57
2021	3	3	381,084	414.22
2022	2	3	422,780	427.05
2023	1	3	465,492	447.59
2024	0	3	547,994	521.90
		average of column ==>		440.27

non-cat ultimate **LOSS**
= (non-cat rptd loss & ALAE) x LDF x ULAE x trends
= 241300 x 1 x 1.03 x (1.04)^4 x (1.02)^3
= 292400 x 1.06 x 1.03 x (1.04)^3 x (1.02)^3
= 325100 x 1.1 x 1.03 x (1.04)^2 x (1.02)^3
= 359200 x 1.14 x 1.03 x (1.04)^1 x (1.02)^3
= 421300 x 1.19 x 1.03 x (1.04)^0 x (1.02)^3

Step 2a calculate projected non-modeled cat pure premium

=	cat-to-AIY-ratio	x	AIY-to-EE	x	ULAE factor
=	0.440	x	**358.00**	x	1.030
=	162.25	*<== final answer for Step 2a*			

side calc to get appropriate value for AIY-to-EE:
The AAD (Average Accident Date) for the AIY-to-EE value must line up with the AAD of the effective period.
AIY-to-EE is a weighted average of AIY-to-EE values for CY 2026 and CY 2027 where the weight given to CY 2026 is: **0.00**

AAD(eff. per.)	=	2027 - 07 - 01								
AAD(2026)	=	2026 - 07 - 01								
AAD(2027)	=	2027 - 07 - 01								
AIY-to-EE	=	**0.00**	x	**342**	+	1.00	x	**358**	=	**358.00**

Step 3 calculate the net reinsurance cost per exposure (assume no exposure trend so use exposures from 2024)

net cost	=	(2024 reinsurance cost	-	2024 reinsurance recoveries)	/	EE for CY 2024		
	=	(55,000	-	34,000)	/	1,050		
	=	20.00	*<== final answer for Step 3*					

Step 4 trend fixed expenses using AWD (since most fixed expenses are incurred when policy is written)

AWD(2024)	=	2024 - 07 - 01
AWD(Eff. Per.)	=	2027 - 01 - 01
trend period	=	2.50

projected fixed expense pure premium

=	E(F) through 2024	x	(1 + trend)^(trend period)	
=	55.00	x	(1.03) ^ 2.5	
=	59.22	*<== final answer for Step 4*		

Reading: Werner Appendix B: Homeowners
Model: Text Example
Problem Type: Pure Premium Rate Indication for Homeowners

Find Calculate the indicated rate given the following information:

Given

effective date	2031	1	1
	year	*month*	*day*

term	12	1
	months	*ren*

V: variable expense	20.0%
Q: profit provision	9.0%
E(F): fixed expenses	$ 74.00

<-- through 2029

historical loss trend	6.0%
projected loss trend	5.0%
fixed expense trend	3.0%
exposure trend	0.0%

non-modeled cat-to-AIY ratio	0.420
2029 reinsurance cost	77,000
2029 reinsurance recoveries	36,000

** assume the net per-exposure cost of reinsurance for the effective period is the same as for CY 2029*

* modeled cat pure premium	30.31

** projected*

CY	EE	non-cat rpt loss & ALAE	LDF	ULAE factor	AIY / EE exp fit
2025	750	244,000	1.00	1.040	286
2026	830	284,000	1.05	1.040	302
2027	990	306,400	1.09	1.040	319
2028	1,000	388,900	1.15	1.040	337
2029	1,090	440,900	1.21	1.040	356
2030					376
2031					**397**
2032					**419**

Step 1	projected……..	ultimate……..	non-cat……..	pure premium	=	512.54	
Step 2a	projected……..	non-modeled…	cat……..	pure premium	=	178.21	
Step 2b	projected……..	modeled……..	cat……..	pure premium	=	30.31	*(given)*
Step 3	projected……..	net……..	reins……..	pure premium	=	37.61	
Step 4	projected……..	fixed……..	expense……..	pure premium	=	78.51	
					total ====>	837.19	*<== final answer*

Step 1 calculate projected ultimate non-cat pure premium

	trend periods		non-cat ultimate	non-cat ultimate
	from CY to 2029	from 2029 to eff. per.	**LOSS**	**Pure Pr.**
2025	4	2.5	361,926	482.57
2026	3	2.5	417,284	502.75
2027	2	2.5	440,893	445.35
2028	1	2.5	556,991	556.99
2029	0	2.5	626,804	575.05
		average of column ==>		512.54

non-cat ultimate **LOSS**
= (non-cat rptd loss & ALAE) x LDF x ULAE x trends
= 244000 x 1 x 1.04 x (1.06)^4 x (1.05)^2.5
= 284000 x 1.05 x 1.04 x (1.06)^3 x (1.05)^2.5
= 306400 x 1.09 x 1.04 x (1.06)^2 x (1.05)^2.5
= 388900 x 1.15 x 1.04 x (1.06)^1 x (1.05)^2.5
= 440900 x 1.21 x 1.04 x (1.06)^0 x (1.05)^2.5

Step 2a calculate projected non-modeled cat pure premium

=	cat-to-AIY-ratio	x	AIY-to-EE	x	ULAE factor
=	0.420	x	**408.00**	x	1.040
=	178.21	*<== final answer for Step 2a*			

side calc to get appropriate value for AIY-to-EE:
The AAD (Average Accident Date) for the AIY-to-EE value must line up with the AAD of the effective period.
AIY-to-EE is a weighted average of AIY-to-EE values for CY 2031 and CY 2032 where the weight given to CY 2031 is: **0.50**

AAD(eff. per.)	=	2032 - 01 - 01								
AAD(2031)	=	2031 - 07 - 01								
AAD(2032)	=	2032 - 07 - 01								
AIY-to-EE	=	**0.50**	x	**397**	+	0.50	x	**419**	=	**408.00**

Step 3 calculate the net reinsurance cost per exposure (assume no exposure trend so use exposures from 2029)

net cost	=	(2029 reinsurance cost	-	2029 reinsurance recoveries)	/	EE for CY 2029		
	=	(77,000	-	36,000)	/	1,090		
	=	37.61	*<== final answer for Step 3*					

Step 4 trend fixed expenses using AWD (since most fixed expenses are incurred when policy is written)

AWD(2029)	=	2029 - 07 - 01
AWD(Eff. Per.)	=	2031 - 07 - 01
trend period	=	2.00

projected fixed expense pure premium

=	E(F) through 2029	x	(1 + trend)^(trend period)	
=	74.00	x	(1.03) ^ 2	
=	78.51	*<== final answer for Step 4*		