Tutorial 5

1. What are the four principles for ratemaking?
2. Using third ratemaking principle, explain why actuary should consider the fundamental insurance equation at individual risk level.
3. An insurance company is trying to price a new product. What is/are the data source that can be used for analysis?
4. What is the premium, $\overline{P}$ if:
   - Expected Loss & LAE = RM250
   - Fixed Expense = RM50
   - Variable expense = 15%
   - Profit Margin = 5%?

Use the following information to answer Q5-Q7:

Statewide Projected Average Premium at Present Rates	RM850.00
Statewide Projected Loss and LAE Ratio	68.00%
Profit and Contingencies Provision	5.00%
Annual Fixed Expense Trend	3.00%

	2003	2004
Countrywide General Expenses	25,000	28,000
Fixed General Expense as percentage of General Expenses	75%	75%
Countrywide Earned Exposures	625	645
Countrywide Written Exposures	640	700
Countrywide Earned Premium	435,000	450,000
Countrywide Written Premium	460,000	475,000

Projected Expense Provisions	Fixed	Variable
Other Acquisition	RM60.00	2.50%
Taxes, Licenses, and Fees	RM2.50	2%
Commissions and Brokerage	None	12%

- All expenses are incurred uniformly throughout the policy period;
- Projected annual policy period beginning July 1, 2005.

5. Calculate the fixed expense provision using the Exposure-Based Projection Method.
6. Calculate the variable expense provision.

7. Calculate the statewide indicated average premium.

Answer Q8 and Q9 using the information below:

Expense Type	Expense Ratio	% Fixed
Commission	15%	0%
Other Acquisition Expenses	4%	80%
General Expenses	8%	60%
Taxes, Licenses, and Fees	4%	20%
Profit and Contingency	5%	10%
Other Expenses	2%	100%

The statewide average loss per exposure is RM500.

8. Calculate the fixed expense ratio (F) and VPLR.

9. Calculate the proposed expense fees given that,

$$\text{Proposed Expense Fees} = \frac{\text{Average Fixed Expense per Exposure}}{\text{VPLR}}.$$

10. You are given the following information about an automobile book of business:

Expense Category	Countrywide Total Expenses	% of Expenses Assumed to be Fixed
Commissions	1,400,000	0%
General Expenses	1,200,000	50%
Other Acquisition	400,000	100%
Premium Tax	300,000	0%
Licenses and Fees	100,000	100%

- Countrywide total premium volume=10,000,000
- Profit and contingencies provision=5%

Calculate the overall indicated average bodily injury premium if the bodily injury loss cost including LAE is $200.

11. Given the following information:

Expense Type	2008 Expense	% Fixed
General	14,000	60%
Other Acquisition	5,600	50%
Commission and Brokerage	21,000	0%
Taxes, License, and Fees	2,800	75%

- 2008 written premium = 160,000
- 2008 earned premium = 140,000
- Statewide average loss cost per exposure = 197.25
- Profit and contingencies provision = 5%
- General expenses are incurred throughout the policy.

- All other expenses are incurred at the beginning of the policy.

Calculate the indicated average rate.

12. You are given the following information:

Expense Type	Historical Expense	% Fixed
General	100,000	60%
Other Acquisition	66,000	50%
Commission and Brokerage	110,000	0%
Taxes, License, and Fees	40,000	25%

- Historical written premium = 1,100,000
- Historical earned premium = 1,000,000
- Projected Loss & LAE ratio = 75%
- Profit and contingencies provision = 5%
- General expenses and taxes, license and fees are incurred throughout the policy.
- All other expenses are incurred at the onset of the policy.

Calculate the indicated rate change.

13. Given that the total permissible loss ratio (TPLR) is 60%, ULAE is 10% and following information:

Acc. Year	On-Level EP	Reported Claims	CDF
2000	200,000	180,000	1.00
2001	250,000	220,000	1.05
2002	300,000	275,000	1.50

- Rates will be in effect for one year
- Policies are annual
- Rate change effective date is Oct 1, 2003
- There is a 2% trend in pure premium

Calculate the indicated rate level change.

14. You are given the following information:

	Territory				Current
AOI	1	2	3	Total	Relativity
Low	7	130	143	280	0.80
Medium	108	126	126	360	1.00
High	179	129	40	348	1.35
Total	294	385	309	988	
Curr. Rels.	0.60	1.00	1.30		

- $V = 30\%, Q_T = 5\%$
- Base level are Medium AOI and Territory 2
- Table below summarizes the premium and loss data

AOI	Terr	Loss and ALAE	Premium @ Curr. Rate
Low	1	210.93	335.99
Medium	1	4,458.05	6,479.87
High	1	10,565.98	14,498.71
Low	2	6,206.12	10,399.79
Medium	2	8,239.95	12,599.75
High	2	12,063.68	17,414.65
Low	3	8,441.25	14,871.70
Medium	3	10,188.70	16,379.68
High	3	4,625.34	7,019.86
Total		65,000.00	100,000.00

Compute the AOI indicated class relativities using all methods (Pure Premium, Loss Ratio and Adjusted Pure Premium).

15. You are given that:

	Reported Loss and LAE			Current Class	Historical Earned Exposures		
Class	Territory A	Territory B	Total	Relativity	Territory A	Territory B	Total
1	250,000	250,000	500,000	1.0	2,000	3,000	5,000
2	225,000	175,000	400,000	1.1	1,500	1,500	3,000
3	200,000	160,000	360,000	0.9	2,000	2,000	4,000
Total	675,000	585,000	1,260,000		5,500	6,500	12,000
Current Territory Relativity					1.0	0.6	

Using adjusted pure premium approach, determine the indicated classification relativities and the indicated territory relativities, using class 1 and territory A as base.

16. You are given the following information:

Territory	Premium @CRL	Reported Loss and ALAE	Claim Count	Current Relativity
1	520,000	420,000	600	0.60
2	1,680,000	1,250,000	1,320	1.00
3	450,000	360,000	390	0.52
Total	2,650,000	2,030,000	2,310	

Assume that Territory 2 is the base territory, calculate indicated territorial relativities.

17. You are given:

Class	Current Rates	EP @ Curr. Rate Level	Reported Loss and LAE
A	140	600,000	450,000
B	120	550,000	425,000
C	100	525,000	375,000
D	80	500,000	325,000
Total		2,175,000	1,575,000

Class A is the base territory. Calculate the indicated class relativities using the loss ratio approach.