22. (3.5 points)

The unlimited and limited loss ratios for five identical risks are as follows:

Risk #	Unlimited Loss Ratio	Limited Loss Ratio
1	30%	15%
2	45%	45%
3	45%	45%
4	90%	60%
5	90%	90%

a. (2.5 points)

Calculate Table L charges at loss ratios of 0% to 90% using increments of 15%.

b. (0.5 point)

Describe the impact on the insurance charge when a loss limit is introduced.

c. (0.5 point)

In practice, sample loss ratios may not equal expected loss ratios. When this occurs, briefly describe two approaches used to address this issue.

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Question 22

Part a)

Sample 1

Avg unlim LR = .6
Avg limited LR = .51

$$LER = \frac{E[LR]_{lim}}{E[LR]_{unlim}} = 1 - 0.51/0.6 = 1 - 0.85 = 0.15$$

(1) LR	(2) # risks	(3) # risk >	(4) # losses over	(5) $X_{part\ LR}$	(6) $X_{Full\ LR}$
0.00	0	5	17	1.0	1.0
0.15	1	4	12	0.7059	0.75
0.30	0	4	8	0.4706	0.55
0.45	2	2	4	0.2353	0.35
0.60	1	1	2	0.1176	0.25
0.75	0	1	1	0.0588	0.20
0.90	1	0	0	0	0.15
		17			

(3) = upward sum of (2)
(4) = upward sum of (3)
(5) = (4) / (3 total)
(6) = LER + (1-LER)(5)

Sample 2

E = .6

$\hat{E}$ = .51

$$LER = \frac{.6 - .51}{0.6} = 0.15$$

LR	r	# risks	# above	% above	partial charge	charge
0.00	0	0	5	1	1	1
0.15	0.294	1	4	0.8	0.706	0.75
0.30	0.588	0	4	0.8	0.471	0.55
0.45	0.882	2	2	0.4	0.235	0.35
0.60	1.176	1	1	0.2	0.1176	0.25
0.75	1.471	0	1	0.2	0.0588	0.20
0.90	1.765	1	0	0	0	0.15

charge = LER + (1-LER) partial charge

Sample 3

$$\text{Ave Unlimited LR} = \frac{.3+.45+.45+.9+.9}{5} = .6$$

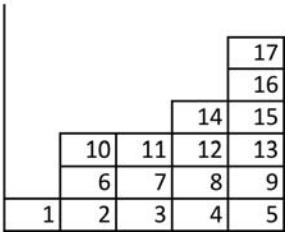
$$\text{Ave Limited LR} = \frac{.15+.45+.45+.6+.9}{5} = 0.51$$

=> 1 - 51/60 = .15 of loss eliminated by loss limitation

Use vertical sum method 1

Table L

LR	L Charge
0	1
15%	.15 + 12/17*.85 = .75
30%	.15 + 8/17*.85 = .55
45%	.15 + 4/17*.85 = .35
60%	.15 + 2/17*.85 = .25
75%	.15 + 1/17*.85 = .2
90%	0.15



Part b)

Sample 1

When an occurrence limit is introduced, some losses are eliminated above that limit and never get considered on an aggregate limit. A charge needs to be included for the occurrence limitation. However, careful not to overlap occurrence charge and aggregate charge if using an unlimited charge table. Table L fixes this by already reflecting the occurrence limitation and adding a charge for it.

Sample 2

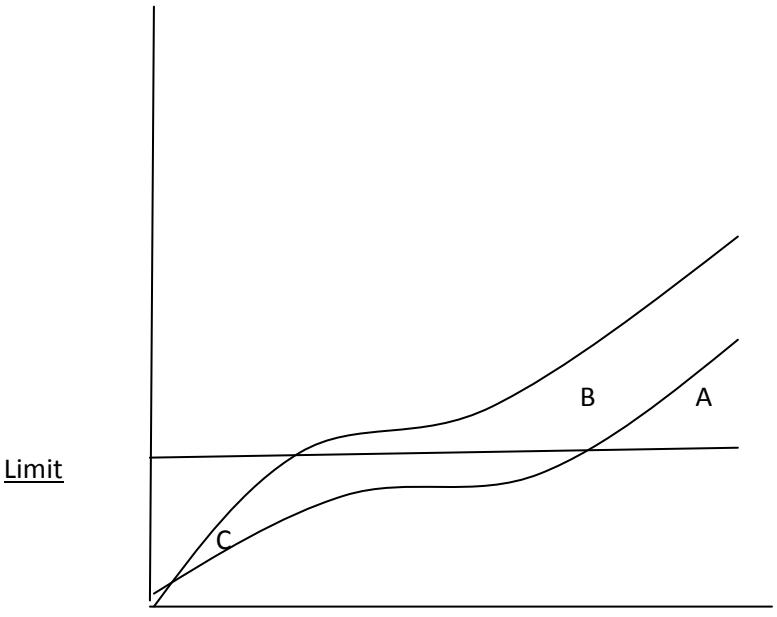
Insurance charge decreases when loss limit is introduced due to overlap between excess loss pure prem factor and insurance charge (assuming insurance charge here is <u>not</u> Table L insurance charge, which includes the LER, and is therefore increased.)

Sample 3

Insurance charge is increased, since both pre occurrence limit and aggregate limit decrease the ratable loss.

Sample 4

When loss limit is introduced, the charge is A + B + C.
Without loss limit, the charge is A + B



Part c)

Sample 1

1) Calculate r using sample LR instead of expected LR.
2) Use expected LR, but at end divide both r and $\phi(r)$ by $\phi(o)$.

Sample 2

When the sample loss ratios are not the same as the expected loss ratios, one of the approach is directly using sample loss ratio to make sure the charge at zero entry ratio is always equal to one. Another approach is to divide all the entry ratios and the charges to the calculated charge at entry ratio zero to obtain the new table of insurance charges.