2. (2 points)

Given the following policy year information:

Effective Date	Overall Average Rate Change
October 1, 2015	5%
April 1, 2016	10%
October 1, 2016	5%

- All policies are annual.
- Policy year 2016 written premium = $100,000.
- Policy year 2016 earned premium = $100,000.
- Policy year 2016 ultimate losses including LAE = $80,000.
- Loss trend = 0%.
- Premium trend = 0%.
- There are no fixed expenses.

a. (1 point)

Calculate the policy year 2016 earned premium at current rate level using the parallelogram method.

b. (0.25 point)

Calculate the variable expense ratio that would earn an underwriting profit of 5% at the current rate level.

c. (0.5 point)

Assume the company rapidly increased exposures throughout 2016. Explain whether the parallelogram method would overstate or understate a rate level indication.

d. (0.25 point)

Briefly describe a scenario in which policy year premium is not fixed at the completion of the policy year.

CONTINUED ON NEXT PAGE

QUESTION 2

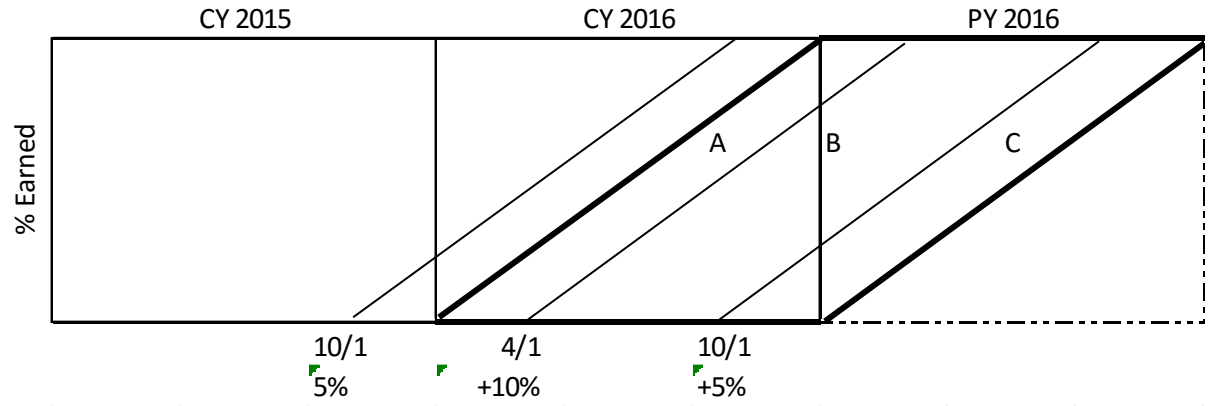
TOTAL POINT VALUE: 2 | **LEARNING OBJECTIVE(S): A2**

SAMPLE ANSWERS

Part a: 1 point

Sample 1

PY 2016 EP @ Current (Annual policies)



Region	Rate Level	Area
A	1.0	0.25
B	1.1	0.5
C	1.1 x 1.05 = 1.155	0.25

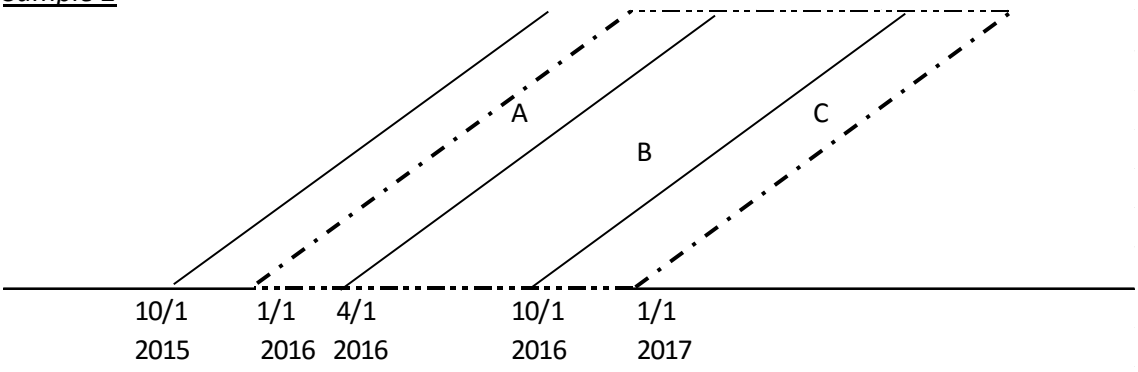
Current Rate Level = 1 x 1.1 x 1.05 = 1.155

Avg Rate Level = 0.25 (1) + 0.5 (1.1) + .25 (1.155)
= 1.08875

On-Level Factor = 1.155/1.08875 = 1.06085

PY 2016 EP @ Current Rate Level = 100,000 x 1.06085 = 106,085

Sample 2



Policy year is represented by the dotted parallelogram

EXAM 5 SPRING 2017 SAMPLE ANSWERS AND EXAMINER'S REPORT

Section	Area	Rate Level Index
A	1/4	1.05
B	1/2	1.1 x 1.05 = 1.155
C	1/4	1.155 x 1.05 = 1.21275

Avg rate level index: ¼ x 1.05 + ½ x 1.155 + ¼ x 1.21275 = 1.1431875

Current rate level index = 1.21275

OLF = 1.21275/1.1431875 = 1.06085

PY 2016 EP at CRL = 100,000 x 1.06085 = 106,085

Part b: 0.25 point

Sample 1

LR = 80,000 / 106,085 = 0.75411
LR/[1-V-Q] = indicated rate change factor
.75411/[1-V-.05] = 1.0 → .75411 = 1 – V - .05
V = 0.1959

Sample 2

80,000/[1-V-.05] = 106,085
1-V-.05 = .75
1-V = .804
V = 19.59%

Part c: 0.5 point

Sample 1

The exposures written towards the end of the year are at the new higher rate level. So the true avg rate level is higher than the one calculated with the parallelogram method. Therefore, the OLF found in a) is overstated and leads to overstated OL Premium → understated loss ratio → understated RL indication

Sample 2

If exposures were rapidly increasing more policies would be written at the higher rate level making the average rate level for 2016 actually higher. This would make the on-level factor lower and premium at current rate level lower. Parallelogram method would lead to an understated indication because it leads to an understand loss ratio.

Part d: 0.25 point

Any one of the following:

- When there is a premium audit after the end of a policy year
- Retrospective rating policies have premium adjustments years after a completed policy year due to loss development

EXAMINER'S REPORT

Candidates were expected to calculate policy year earned premium at current rate level using the parallelogram method and then use this premium to determine the variable expense ratio. Candidates were also expected to understand the basic assumption of the parallelogram method

and how a violation of that assumption would impact a rate level indication. Finally, candidates were expected to understand the reasons for policy year premium development.

Part a

Candidates were expected to calculate the appropriate on-level factor using the parallelogram method and apply to earned premium to develop policy year 2016 earned premium at current rate level.

Common errors included:

- Calculating an on-level factor for calendar year 2016 instead of policy year 2016.
- Calculating the average rate level without cumulating the rate changes.

Part b

Candidates were expected to estimate the variable expense ratio using the earned premium at current rate level calculated in part a. based on the loss ratio rate indication formula.

Common errors included:

- Using the 2016 earned premium not at current rate level.
- Mismatching between the premium used and the indicated rate level change.

Part c

Candidates were expected to understand the underlying assumption of the parallelogram method is that premium is written evenly throughout the year and that the growth in exposures violated this assumption. Candidates were expected to demonstrate the impact of the increase in exposures on the on-level factor/premium at current rate level that would then impact the loss ratio used in the rate level indication.

Common errors included:

- Commenting on the average rate level but not commenting on the impact this would have on the rate level indication.
- Stating that the parallelogram method assumes uniform writing of exposures but not explaining how this would impact the calculation underlying the indication.
- Pointing out changes to the loss experience or average accident date, as there is not enough information to discuss how this could be impacted by the growth in exposures.

Part d

Candidates were expected to differentiate between different premium aggregations and state the reasons for premium development after the end of the policy year.

Common errors included:

- Discussing loss development (other than retro policies), which would not impact policy year premium development.
- Discussing the mechanics of earning premium over the course of the policy year.
- Commenting on cancellations that occur mid-term but in the next calendar year. These would occur before the end of the policy year, and would not cause changes after the policy year ends.