

5. (3 points)

An insurance company writes annual policies. The history of law and coverage changes affecting benefit levels is as follows:

Effective Date	Direct Impact of Benefit Change
February 15, 2014	+6.5%
October 1, 2014	+4.3%

a. (1.25 points)

Calculate the direct benefit change loss adjustment factor for fourth accident quarter 2014, assuming both changes only affect losses on policies written on or after the effective date of the change.

b. (1.25 points)

Calculate the direct benefit change loss adjustment factor for first policy quarter 2014, assuming both changes affect all claims that occur on or after the effective date of the change.

c. (0.5 point)

In doing a rate level calculation, the actuary for this insurance company has selected an annual loss trend based on unadjusted pure premium data from 2012 through 2014. Assess the appropriateness of this selection and suggest an adjustment, if necessary.

EXAM 5 SAMPLE ANSWERS AND EXAMINER'S REPORT

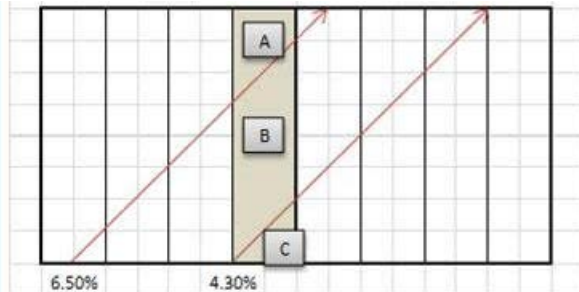
QUESTION 5

TOTAL POINT VALUE: 3.0

LEARNING OBJECTIVE: A2

SAMPLE ANSWERS

Part a: 1.25 points



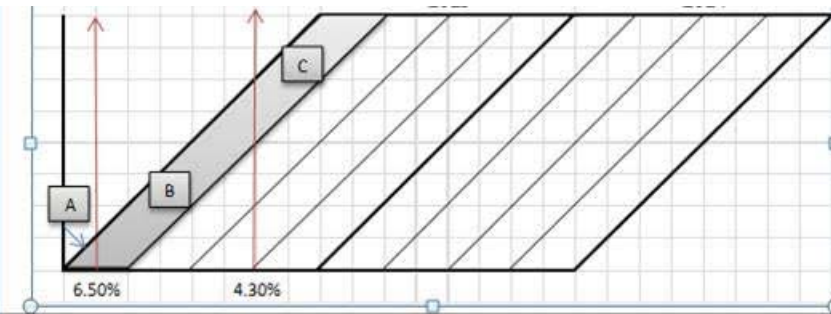
$$\text{Area of A} = (0.125 + 3 \times 0.125) / 2 \times 0.25 = 0.0625$$

$$\text{Area of B} = 0.25 - A - C = 0.15625$$

$$\text{Area of C} = (0.25 \times 0.25) / 2 = 0.03125$$

$$\begin{aligned} \text{Adjustment} &= (1.065 \times 1.043) / (1.00 \times (0.0625/0.25) + 1.065 \times (0.15625/0.25) + (1.065 \times 1.043) \times \\ &\quad (0.3125/0.25)) \\ &= 1.0534 \end{aligned}$$

Part b: 1.25 points



$$\text{Area of A} = (0.125 \times 0.125) / 2 = 0.0078$$

$$\text{Area of B} = 0.25 - A - C = 0.1484$$

$$\text{Area of C} = (2 \times 0.125 + 4 \times 0.125) / 2 \times 0.25 = 0.09375$$

$$\begin{aligned} \text{Adjustment} &= (1.065 \times 1.043) / (1.00 \times (0.0078/0.25) + 1.065 \times (0.1484/0.25) + (1.065 \times 1.043) \times \\ &\quad (0.09375/0.25)) \\ &= 1.0284 \end{aligned}$$

Part c: 0.50 points

Sample Answer 1

This is not appropriate as the loss trend will be distorted by the benefit level changes (in this case overstated). Use losses adjusted for benefit level changes instead to produce trends.

Sample Answer 2

EXAM 5 SAMPLE ANSWERS AND EXAMINER'S REPORT

Selection not appropriate – should adjust pure premium data for direct benefit changes, then select loss trend. Otherwise, would double-count effect of direct benefit changes.

Sample Answer 3

This will double-count the effect of the benefit change. The pure premium trend selected will also reflect the benefit change, so the trend selected will be too high. So it's not appropriate. Adjustment: adjust loss to the benefit level after these two benefit changes. Calculate the pure premium using losses after loss adjustment factor and select pure premium trend based on this data.

Sample Answer 4

The actuary should adjust for one-time changes such as law and coverage changes before calculating trend. If actuary does not adjust for one-time changes, they will be incorporated into the loss trend and be applied as a continuous change when they are not expected to continue.

Sample Answer 5

Annual loss trend will be overstated because it includes the underlying increases in benefit change. Actuary should restate pure premium to current benefit level before determining the annual loss trend.

EXAMINER'S REPORT

Part a

The candidate was expected to be able to:

- Correctly identify and work the problem on the accident quarter
- Correctly understand how the direct benefit changes impacted loss claims
- Calculate the proportion of the accident quarter at each benefit level
- Determine the adjustment factor, based on the current rate level and average rate level calculated on the accident quarter

A graph or diagram was not required for credit.

Common mistakes included:

- Incorrect application of accident vs. policy quarter and/or how the direct benefit changes impacted loss claims
- Incorrect calculation of weights due to geometrical errors
- Failing to adjust weights so that they were consistently on either an annual (% of total year) or quarterly (% of total quarter) basis
- Applying the problem to the wrong quarter or using the accident year rather than an accident quarter.
- Some candidates failed to apply a second benefit impact to either of the parts, failing to recognize that both benefit level changes impacted the accident quarter in question

Part b

EXAM 5 SAMPLE ANSWERS AND EXAMINER'S REPORT

The candidate was expected to be able to:

- Correctly identify and work the problem on the policy quarter
- Correctly understand how the direct benefit changes impacted loss claims
- Calculate the proportion of the policy quarter at each benefit level
- Determine the adjustment factor, based on the current rate level and average rate level calculated on the policy quarter

A graph or diagram was not required for credit.

Common mistakes included:

- Performing the problem on an accident quarter basis
- Calculating the benefit impact only on policies written on or after the effective date of the change.
- Incorrect calculation of weights due to geometrical errors
- Failing to adjust weights so that they were consistently on either an annual (% of total year) or quarterly (% of total quarter) basis
- Applying the problem to the wrong quarter or using the policy year rather than a policy quarter.
- Some candidates failed to apply a second benefit impact to either of the parts, failing to recognize that both benefit level changes impacted the policy quarter in question

Part c

The candidate was expected to be able to provide reasoning as to why the trend selection would be inappropriate and suggest a reasonable adjustment to the loss data to avoid this issue.

Common mistakes included:

- Inappropriately applying the concepts of the question to premium or exposure trending
- Failing to address both portions of the question, the assessment and the suggested adjustment
- Incomplete or vague assessments/adjustments. For example, simply stating that it was not appropriate was not enough for assessment credit. Similarly, saying that the losses should be adjusted was not specific enough to receive credit for that portion.