3. (3 points)

Given the following information:

Current Rate Review	
Number of Exposures	20,000
Indicated Rate Change before credibility	7.9%
Projected Frequency	3.0%
Annual Loss Trend	-1.0%
Annual Premium Trend	1.5%
Target Effective Date	January 1, 2019

Prior Rate Review	
Indicated Rate Change	8.0%
Implemented Rate Change	3.5%
Effective Date	January 1, 2017

Normal Distribution Table	
p	z(p)
0.800	0.842
0.850	1.036
0.900	1.282
0.950	1.645
0.975	1.960
0.990	2.326

- The loss experience is considered fully credible if there is a 90% probability that the observed experience is within 2.5% of its expected value.

a. (2.25 points)

Calculate the credibility-weighted indicated rate change using the classical credibility approach and trended present rates as the complement of credibility.

b. (0.75 point)

Identify three other complements of credibility appropriate for first dollar ratemaking.

QUESTION 3	
TOTAL POINT VALUE: 3	**LEARNING OBJECTIVE(S): A3, A8**
SAMPLE ANSWERS	

Part a: 2.25 points

Sample 1

Trend period is from 1/1/2017 to 1/1/2019 – 2 years

Complement = (loss trend/premium trend)^2 x (indicated rate change/implemented rate change)
= (1-1%)/(1+1.5%)^2 x (1+8%)/(1+3.5%)
=0.9927

Expected claim counts = # of exposures x projected frequency
=20,000 x 3% = 600

Full Credibility = (1.645/2.5%)^2 = 4330 claims
Z = SQRT(600/4330) = 37.2%

Credibility-weighted indicated rate change = 37.2% x 1.079 + (1-37.2%) x 0.9927
=1.0248 >>> +2.48%

Sample 2
(1.645/0.025)^2 = 4329.64 >>> Number of claims needed for full credibility
4329.64/0.03 = 144321.3 >>> Number of exposure needed

Z = SQRT(20000/144321) = 0.372

1.079(0.372) + (1-0.372)(1.08/1.035)(0.99^2/1.015^2) = 1.0248

2.48% indicated rate change

Part b: 0.75 point

Any three of the following:
- Competitors rate information
- Loss costs of larger related group (i.e. company's countrywide date; regional; etc.)
- Rate change of larger related group
- Industry benchmarks
- Harwayne's method

EXAMINER'S REPORT

Candidates were expected to understand a credibility weighted indication and how to calculate credibility and the complement of credibility. Candidates generally struggled with the calculation of credibility; that is, not knowing how to use the data given to calculate credibility.

Part a
Candidates were expected to calculate the credibility of the given data, calculate the complement of credibility, and, given the results of those answers and the indicated change before credibility, calculate the final credibility weighted indication. Common mistakes included: • Not using the correct z-score from the given normal distribution table • Not getting the correct number of claims for full credibility • Not getting the correct number of exposures for full credibility • Not getting the correct credibility • Assuming a credibility percentage instead of calculating one • Not getting the correct trend period • Not getting the correct residual indication • Not getting the correct net trend • Not getting the correct trended present rate indication • Not applying the credibility and/or the complement to the correct numbers

Part b
Candidates were expected to list three alternative methods for calculating a complement of credibility for first dollar ratemaking. A common mistake was not listing three applicable methods.