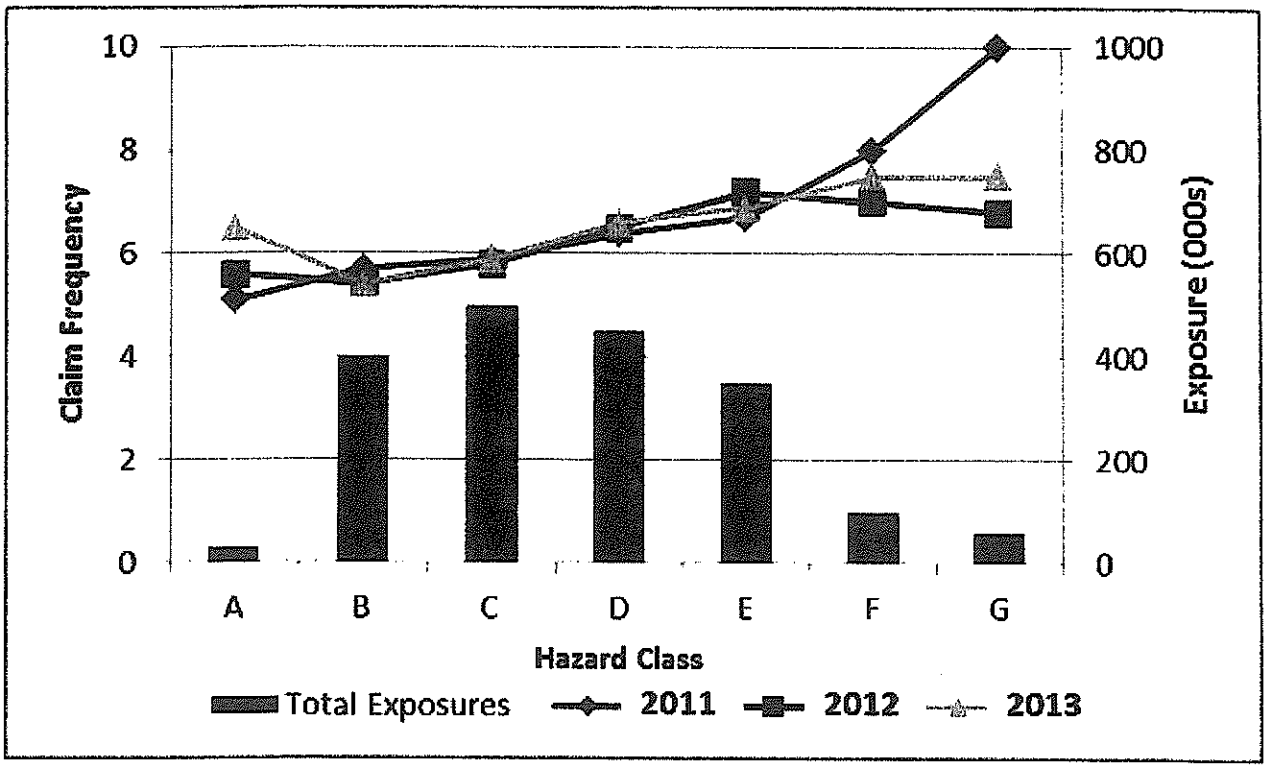
10. (1.75 points)

An actuary performed an analysis of a products liability class plan using a Generalized Linear Model (GLM) for the first time on this book of business. The insureds are categorized by hazard classes A through G. The following graph shows claim frequency and exposure data by hazard class.



a. (0.75 point)

Fully evaluate the predictive value of hazard class based on the information provided above.

b. (1 point)

Briefly describe two data mining techniques and how each might be used to enhance a GLM multivariate classification analysis.

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EXAM 5 FALL 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 10	
TOTAL POINT VALUE: 1.75	**LEARNING OBJECTIVE: A9**
SAMPLE ANSWERS	
Part a: 0.75 point	
Indicated relativities generally increase without reversals, which suggest this variable could be statistically significant. Looking at the ind. rel. by years, all three year's curve lie closely on top of each other & show consistent upward direction, so the variable passes consistency test. Note that there's a little disparity for Hazard class A & G, but those levels have few exposures, so the disparity for those do not disqualify the stable results for B to F.	
Part b: 1 point	
CART: a tree structured series of if-then scenarios which helps to identify the relationships among variables. Could help to identify interaction variables for GLM analysis. Neural network: training program, data can be fed into the neural network & the program will automatically learn the structure of the data. Essentially an iterative GLM process. Could identify missing predictive variables in the GLM analysis.	
EXAMINER'S REPORT	
Part a	
Candidates generally were able to fully evaluate the predictive power. Responses were accepted for both good and poor predictive power given the response was supported by a reasonable rationale. Also, candidates were given credit for evaluative statements and did not need to comment of the usability of this variable in a rate plan to receive full credit. Some candidates simply described the graph. These responses were not given full credit unless accompanied by statements evaluating the predictive value of results.	
Part b	
To receive full credit, candidates needed to describe two techniques and explain how appropriate data mining techniques would enhance a GLM analysis. Some candidates only described or only related back to GLM, which did not receive full credit. Many candidates simply identified analysis techniques (model validation, supplementary data), which did not receive credit.	