ADM 2303 F

Assignment 3 part 2

CHENXI FANG

6610278

Q1 : Bombardiers of Montreal

a) $z = \frac{x - \mu}{\sigma}$

Bombardiers service share will be lower in 2014 than in 2010.

$\chi = 14\% \quad \mu = 13\% \quad \sigma = 1\%$

$$z = \frac{14\% - 13\%}{1\%}$$

$$= 1$$

According to the Normal Cumulative Probability Table, $P(z = 1)$=0.8413.

Therefore, the probability that Bombardiers service share will be lower in 2014 than 2010 is 0.8413.

b) $z = \frac{x - \mu}{\sigma}$

Rolls Royce's service share will be higher in 2014 than in 2010.

$\chi = 51\% \quad \mu = 54\% \quad \sigma = 2\%$

$$z = \frac{51\% - 54\%}{2\%}$$

$$= -1.5$$

According to the Normal Cumulative Probability Table, $P(z = -1.5)$=0.0668.

1-0.0668=0.9332

Therefore, the probability that Rolls Royce's service share will be higher in 2014 than in 2010 is 0.9332.

c) My assumption is that the continuous probability distribution is a normal distribution.

First, we can see from the question that the standard deviation is small. Moreover, it is defined by two parameters, mean and standard deviation. There also has no discussion about interval of time (or space) between events. And since the probabilities are significantly different during the same period, we can assume that the continuous probability distribution is a normal distribution.

d) I think Nina's statement in relation is not fit for the ASA Ethical Guidelines in Appendix C.

Appendix C refers Responsibilities in Publications and Testimony. Therefore, Nina is expected to clearly report all data she refers to and samples she used to analyze. Moreover, it seems that she does not done enough research. Maybe she will find out the relationship is only association but not necessary causation after analyzing a lot of data. Therefore, in older to validly prove her statement, she also needs to do more research and analyze of her data.

Q2: The Charlevoix Seismic Zone

a) $P(x \le a) = 1 - e^{-\lambda a}$

For some one living in 1926.

$$\lambda = \frac{1}{52.4} \qquad a = 10$$

$$P(x \le 10) = 1 - e^{-(\frac{1}{52.4})(10)} = 0.174$$

b) $P(x \le a) = 1 - e^{-\lambda a}$

For some one living in2013.

$$\lambda = \frac{1}{52.4} \qquad a = 10$$

$$P(x \le 10) = 1 - e^{-(\frac{1}{52.4})(10)} = 0.174$$

c) Because the occurrence of one earthquake does not affect others, which means it is an independent event. Therefore, the calculation and result for b) and c) should be the same. Earthquakes occur randomly, therefore, there is a certain time period between two continuous event. I use the exponential distribution for this case since it refers the time interval between events.

Q3: Aluminum and Alzheimers Disease

a) First, It is sad to see that this man has been diagnosed with the Alzheimers disease. However, as the expert witness for the drinks manufacturer, I would like to point out some significant fallacies that exist in their testimony. It is unreasonable to draw the conclusion that the man got Alzheimers disease because he drinks a lot of the company's products which are contained in cans made in aluminum. Firstly, the testimony of the expert witness from the other side is only based on their own assumptions. The aluminum deposits in patients' brains can result from many different ways, such as the using of aluminum pot and aluminum kettle. Since most people cook by aluminum pot for their daily meals, the probability that one gets aluminum form water boiled by aluminum kettle and foods cooked by aluminum pot is much higher than they get it from drinks which is contained in aluminum cans. Therefore, it is unjust to say that the company's products is the only reason

for why he got the Alzheimers disease. In addition, although there are many studies indicate that patients with the Alzheimers disease have absorbed a high level of aluminum in their brain, it can only prove that the two events are correlated but it is invalid to say that there is causality between the two. In order to prove that drink the products from the company causes the Alzheimers disease, the expert witness of the other side should provide further evidence form corroborating information. For instances, they should consider the amount of aluminum to produce one can, and calculate the probability that people will get high level aluminum by drinking 1 to 2 can per day. They should also consider the probability that customers who consume 1 to 2 of our products everyday that have been diagnosed with the Alzheimers disease etc.

b) My testimony is consistent with the ASA guidelines on ethics because in terms of professionalism, responsibilities in publications and testimony, and responsibilities of employers. First, all of my conclusions are made through relevant statistical analysis by using statistical methodologies. In addition, I clearly report all data I refers to and samples I used to prove my conclusions. Furthermore, since there are logical and moral reasons behind everything I have testified, I am not making up anything. The statements I made is valid and statistical. Therefore, my testimony is consistent with the ASA guidelines on ethics.

c) In terms of professionalism, the testimony of the expert witness for the other side is consistent with the ASA guidelines on ethics. If they cannot provide sufficient evidences to say that the cans from that company are responsible for the man being diagnosed with Alzheimers disease, the testimony that there is a causality between the two events is only an assumption. Therefore, the expert witness for the other side should do more research regarding to the topic and analyze it profoundly before they make conclusions. In terms of responsibilities in publications and testimony, the expert witness for the other side should logically and statistically prove the validity of their testimony. Such as do some calculation of probability that I indicate in part a. In terms of responsibilities of employers, the expert witness for the other side should make sure that everything they have testified is valid and statistical.