BM508 Managerial Statistics Spring 2024 Due 4/16/2024 @11:59pm

* Please specify the software you used for the questions.
* Please write down and submit your answers using Word document and attach the outputs generated from your software.
* Do not simply send an Excel output as your homework without organizing it in the Word document.
* If you are using R, Stata, or Python, please also submit your codes.
* Late Penalty: 5 points per day!! (If you have any question that may delay your submission, please let me know in advance.)

Assignment #2

1. A record shows that 12% of students registered for the managerial statistics course withdrew without completing it. In the new semester, 50 students registered for the course. Answer the following questions assuming the number of withdrawals follows a binomial distribution (20%)
   1. Compute the probability that 4 or fewer will withdraw.

P(X<=4) = 0.2680

* 1. Compute the probability that exactly 8 will withdraw.

P(X=8) = 0.1075

* 1. Compute the probability that more than 10 will withdraw.

P(X>10) = 0.0325

* 1. Compute the expected number of withdrawals.

E(X) = 6

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自動產生的描述

1. According to the National Oceanic and Atmospheric Administration, the state of Colorado averages 8 tornadoes every June (Note: There are 30 days in June). Assume the number of tornadoes per month follows Poisson distribution. (20%)
   1. Compute the mean number and standard deviation of tornadoes per day in June.

Mean = 0.2667 , Stand deviation = 0.5164

* 1. Compute the probability of no tornadoes during a day in June.

P ( k = 0 ) = 0.7659

* 1. Compute the probability of exactly one tornado during a day in June.

P ( k = 1 ) = 0.2042

* 1. Compute the probability of more than two tornados during a day in June.

P ( k > 2 ) = 0.0026

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自動產生的描述

1. One indicator of the level of economic hardship is the number of people who bring items to a pawnbroker. Assume that the number of people bringing items to a pawnshop per day is normally distributed with a mean of 650. (15%)
   1. Suppose you learn that on 3% of the days, 600 or fewer people brought items to the pawnshop. What is the standard deviation of the number of people bringing items to the pawnshop per day?

Standard deviation = 26.5845

* 1. On any given day, what is the probability that between 625 and 675 people bring items to the pawnshop?

P( 625 < X < 675) = 0.6530

* 1. How many people bring items to the pawnshop on the busiest 5% of days?

最繁忙的五天中有***693人***

bring items to pawnshop

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自動產生的描述

1. A report indicated that the mean daily TV watching time for a household in Kaohsiung is 2.6 hours and the standard deviation is 0.8. Assume that the daily TV watching time follows a normal distribution. Suppose you randomly selected a sample of 30 households in Kaohsiung. (20%)
   1. What would be the two parameters of the sampling distribution, that is, the mean of the sample means and the standard deviation of the sample means (standard error)?

Mean of sample means = 2.6

Standard error = 0.1461

* 1. What is the probability that a sample provides a sample mean between 2.5 and 3.0 hours a day?

P = 0.7501

* 1. If the sample mean for the 30 households is 2.4, what is the 95% confidence interval of the daily TV watching time?

95% C.I = ( 2.1137, 2.6863 )

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自動產生的描述

* 1. Interpret the confidence interval from (c).

每日看電視時間的 95% 信賴區間為 (2.1137, 2.6863) 小時，這意味著我們有 95% 的信心說高雄市平均每個家庭看電視的時間在 2.1137 至 2.6863 小時的範圍內，如果我們重複抽樣，我們預計 95% 的樣本的真實總體平均電視觀看時間會落在該區間內。

5.Based on an authoritative report, the approval rating for the City Major in the population of Happy City is 65% last year. A poll center conducted a survey with 60 random town citizen last year and found their result was 62%. Respond to the following questions assuming the sampling distribution follows a normal distribution (25%)

1. What would be the two parameters of the sampling distribution?

Mean = 0.65

Standard error = 0.0616

1. What is the 95% confidence interval of the Major’s approval rating based on the samples?

95% C.I = (0.5293 , 0.7707)

1. Based on (b), can you say the approval rating from the survey different from that in the authoritative report? Why or why not?

95%信賴區間（0.5293，0.7707）包含了權威報告的支持率（0.65），因此我們不能說調查的支持率與權威報告的支持率不同。調查結果落在信心區間內，表示說調查結果與權威報告相符，所以我們沒有證據證明調查的支持率與權威報告中的支持率不同。

In this year, the poll center wants to conduct the survey again. They desire a 0.95 probability that the sample proportion is within ±0.03 (or ±3%) of the population proportion. How large of the sample size is needed to meet the required precision if we use the approval rating last year, 0.65, as the background proportion (planning value)?

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1. From (d), now it is concerned that the previous report is no longer valid for being a background value. How large a sample size is needed if no background value available?

1068人

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自動產生的描述