Homework 3\_01

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urlRemote <- "https://raw.githubusercontent.com/"   
pathGithub <- "EricBrownTTU/ISQS5346/main/"   
filename <- "InsuranceClaims.csv"  
InsuranceClaims <- read.csv(paste0(urlRemote, pathGithub, filename))

## a. Constructing a 95% confidence interval for the population proportion of all auto injury files that have exaggerated loss amounts:

# Load the required library  
library(stats)  
  
# Calculate the sample proportion  
p\_hat <- sum(InsuranceClaims$Buildup) / nrow(InsuranceClaims)  
  
# Calculate the standard error  
se <- sqrt((p\_hat \* (1 - p\_hat)) / nrow(InsuranceClaims))  
  
# Set the confidence level and calculate the critical value  
confidence\_level <- 0.95  
z <- qnorm((1 + confidence\_level) / 2)  
  
# Calculate the confidence interval  
ci\_proportion <- c(p\_hat - z \* se, p\_hat + z \* se)  
  
# Print the confidence interval  
print(ci\_proportion)

## [1] 0.4642898 0.6690435

## b. Constructing a 95% confidence interval for the population mean excess payment amount:

# Calculate the sample mean and standard deviation  
x\_bar <- mean(InsuranceClaims$ExcessPayment)  
s <- sd(InsuranceClaims$ExcessPayment)  
  
# Calculate the standard error  
se\_mean <- s / sqrt(nrow(InsuranceClaims))  
  
# Set the confidence level and calculate the critical value  
confidence\_level <- 0.95  
t <- qt((1 + confidence\_level) / 2, df = nrow(InsuranceClaims) - 1)  
  
# Calculate the confidence interval  
ci\_mean <- c(x\_bar - t \* se\_mean, x\_bar + t \* se\_mean)  
  
# Print the confidence interval  
print(ci\_mean)

## [1] 136.2848 502.2120

## Based on the confidence intervals developed in parts (a) and (b), we can assess the insurance company’s claims.

## a. Proportion of Buildup:

## The estimated proportion of buildup provided by the insurance company is 0.75. Comparing this estimate with the confidence interval [0.4642898, 0.6690435] calculated in part (a), we can see that the estimate falls outside the confidence interval. This suggests that the estimate of 0.75 for the proportion of buildup may be too high or exaggerated. There is uncertainty regarding the true proportion based on the available data.

## b. Average Excess Payment:

## The insurance company estimates the average excess payment to be 400. Comparing this estimate with the confidence ## interval [136.2848, 502.2120] calculated in part (b), we can see that the estimate of 400 falls within the confidence interval. This suggests that the estimate is plausible and supported by the available data.

## Based on the confidence intervals, the insurance company’s claim regarding the average excess payment of 400 is supported, but their claim regarding the proportion of buildup being 0.75 is not strongly supported and may be overstated.