1. Determine the necessary sample size to estimate the populaton mean within 4 units, with confidence 95\%. For your determination, make use of the following sample of data (a pilot study):

E= 4

CI = 95%

Z for 95% CI = 1.96

SD = 22.856

E = Z\*sd/sqrt(n)

n = (Z\*sd/E)^2

n = (1.96\*22.856/4)^2

n = 125.4  = 126

1. Source (copy and paste into the R session) the following function. It returns a table containing two columns: column one contains the confidence percentages 80, 85, 90, 95, 99 and column 2 contains the sample size determinations for estimating the mean mu. Input consists of the bound B (within B) and a sigma from a pilot study. Run it for the last problem and verify, for confidence 95%, that it produces the same n as you got.

Okay.

1. Determine the necessary sample size to estimate the populaton proportion within .08, with confidence 95%, using the conservative rule.

E = z\*sqrt(p\*(1-p)/n) = 0.08

z for 95% CI = 1.96

p = 0.5

E =  z\*sqrt(p\*(1-p)/n)

==> n = (z\*sqrt(p\*(1-p))/E)^2

==> n = (1.96\*sqrt(0.5\*0.5)/0.08)^2

==> n= 150.0625

1. Write a function which returns a table containing two columns: column one contains the confidence percentages 80, 85, 90, 95, 99 and column 2 contains the corresponding sample size determinations for estimating the population proportion within B, using the conservative rule. Input is the vector of percentages and B. Verify the program for the last problem.

ssd <- function(vecpct=c(80, 85, 90, 95, 99),B){

ss <- c()

m <- length(vecpct)

for(i in 1:m){

alp2 <- (1-(vecpct[i]/100))/2

zc <- abs(qnorm(alp2))

ss[i] <- (zc\*sig/B)^2

}

mat <- cbind(vecpct,round(ss))

return(mat)

}

1. A store stocks 5 brands on an item including Brand A. The table below consists of the poll results on the purchases of item A and not A before and after an intensive marketing campaign on Brand A. Has the campaign been effective. Answer based on a 95% confidence interval.

p1 > p2

p1 =< p2

1: before campaign

n1 = (28+82) = 110

p1 = 28/(28+82) = 0.2545

so, 2: after campaign

n2 = (45+93) = 138

p1 = 45/(45+93) = 0.3261

p = (p1\*n1 + p2\*n2) /(n1+n2)

p= 0.2943

SE = sqrt( p\*(1-p)\*(1/n1+1/n2) )

SE = 0.05825

z = (p1-p2)/SE

z= -0.0716

P = P(Z< -0.0716) = 0.4715

significance level = 1-0.95 = 0.05

Interpretation

As the P-value = 0.4715 > significance level=0.05 null hypothesis can't be rejected.

**yes, the campaign was effective**

1. Let mu1 be the maximum head breadth for an ancient Etruscan and let mu2 be the maximum head breadth for a modern Italian. Using the class data (look [here](http://fisher.stat.wmich.edu/joe/Stat5660/Data/) ) obtain a 99% confidence interval for mu1 - mu2. On the basis of this CI make a conclusion in terms of the problem.

Etruscan Head sizes

n1= 84

mu1 = 143.774

sd1 = 5.935

Italian Head sizes

n2 = 70

mu2 = 132.443

sd2 = 5.7

SE = sqrt(sd1^2/n1 + sd2^2/n2 )

SE = 0.94

so,

df = (n1-1)+(n2-1) = 152

df=152 and CI = 99%

t  = 2.609

CI lower limit = (mu1-mu2)-t\*S = 8.878

CI upper limit = (mu1-mu2)+t\*S = 13.783

**CI = ( 8.878 to 13.783 )**