LAB EXPERIMENT-07

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SLOT: **L19 L20.**

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Q .Suppose the manufacturer claims that the mean lifetime of a light bulb is more #than 10,000 hours. In a sample of 30 light bulbs, it was found that they only Last 9,900 hours on average. Assume the population standard deviation is 120 hours. At 0.05 significance level, can we reject the claim by the manufacturer?

Q .Suppose the mean weight of King Penguins found in an Antarctic colony last year was 15.4 kg. In a sample of 35 penguins same time this year in the same colony, the mean penguin weight is 14.6 kg. Assume the population standard deviation is 2.5 kg. At .05 significance level, can we reject the null hypothesis that the mean penguin weight does not differ from last year?

Q .The average mark scored by 32 boys is 72 with a S.D of 8, while that for 36 girls is 70
with a S.D. of 6. Test at 1% level of significance whether the boys perform better than girls.

Q .Suppose the food label on a cookie bag states that there is at most 2 grams of saturated fat in a single cookie. In a sample of 35 cookies, it is found that the mean amount of saturated fat per cookie is 2.1 grams. Assume that the population standard deviation is 0.25 grams. At 0.05 significance level, can we reject the claim on food label?

Q .A Model Examination was conducted to XII Standard students in the subject of Statistics. A District Educational Officer wanted to analyze the Gender-wise performance of the students using the marks secured by randomly selected boys and girls. Sample measures were calculated and the details are presented below:

Gender	Sample Size	Sample Mean	Sample Standard deviation
Boys	100	50	4
Girls	150	51	5

Test, at 5% level of significance, whether performance of the students differ significantly with respect to their gender.

```
xbar=9900
mu0=10000
sigma=120
n=30
z=(xbar-mu0)/(sigma/sqrt(n))
z
alpha=0.05
zalpha=qnorm(1-alpha)
zalpha
if(abs(z)<abs(zalpha)){print("hypothesis accepted")}else{print("Hypothesis rejected")}

xbar=14.6
mu0=15.4
sigma=2.5
n=35
z=(xbar-mu0)/(sigma/sqrt(n))
z
alpha=0.05
zalpha=qnorm(1-(alpha/2))
zalpha
abs(z)
if(abs(z)< abs(zalpha)){print("Ho is accepted")}else{print("Ho is rejected")}

n1=32
n2=36
x1=72
x2=70
sigma1=8
sigma2=6
zcal=(x1-x2)/sqrt((sigma1^2/n1)+(sigma2^2/n2))
zcal
alpha=0.01
zalpha=qnorm(1-alpha)
zalpha
if(abs(zcal)<abs(zalpha)){print("hypothesis accepted")}else{print("Hypothesis rejected")}
```

```
x bar=2. 1
z uO=Z
s 5 9 rna=O. 2 5
n= 3 5
z= (xbar —mu0) / (s J gmt.”sqrz {n) }
z
a4pha=O.05
zalpha=qnorm(1-a]phz)
zaJpha
if(abs(z)<abs(za7pha)){print(”hypothes4s accepted”)}else{print(”Hypothes4s rejected”)}

n1=100
n2=150
X1=5O
XZ=31
sigma1=4
sigma2=5
z = (xl —x2) . sq r x ( (s i qma1^2 n1)+ (s 4 gna2*2. n2) )
z
a4pha=O.05
zaJpha=qnorm(1-a]phz.’’’2)
zalpha
if(abs(z)<abs(za7pha)){print(”hypothesis accepted”)}else(print(”HypothesJs rejected”)}


> xbar=99o0
> nu0=1OOOO
> st gma=12O
> n=30
> z={xbar -mu0}/ (s ) gmzr/sqrt {n}}


> a1pha=O. 05
> za1pha=qnDrm(1-a1pha.}
> za1pha

> if(abs(z)<abs(za7pha)){print(”hypothesis accepted™)}else{print(”Hypothesis rejected”)}
{1§ "Hypothes J s rej ect ed"

> xbar=14.6
> mu0=15.4
> sigma=2. 5

> z= (xbar - run 0) / (s i qma/sq r t (n))

§1§ —1. 893i46
> a1pha=O. O5
> za1pha=qnDrm (1 - (al phs/2}}
> za1pha

> abs(z}
{1§ 1. 893146
> If {abs(z} abs (zal phs}} (prlnz "Ho ñ s accepted "} }e1s e(pr1nz ( "Ha J s rej ect ed " } }
§1§ ’HD s accepted "
```

```
> n1=32
> n2=36
> x1=72

> st gnJa1=8
> of gnJa2=fi
> zeal=(x1-x2 /sq rt ({5JgnaL^2/nt)+{3 gn a2^2."n2))
> zcal
[1] 1.154701
> alpha=0.01
> z61pha=qnorm (1- nl p ha)
> z6l pha
{T§ 2. 32fi 348
> al (abs (zcal) ents (za1pha)) (pr a nt "hypo£hesi s nc c epTed") }e1se(pr 1nz ("HypD£hesIs r e ecued") }
[I.§ " hypothes s nc c e pt ed "

> xbai =2. 1
> nuO=2
> s4g +a=0.2S
> n=35
> z= (x bai — niu 0) / (s qma.' s q r t (n))
> z

> apha=0.05
> zapha=qnorml-alpha)
> zaJpha
[Ij 1.644854
> Jf(abs(zj<ahs(zalpha)){print("hypothesls accepted")}else{prJnt("Hypothesis rejected")}
 1J " Hypo£he si s r e j e cz ed "


> n1=100
> n2=150
> x1=50
> x2=51
> signals
> s1gmaZ=5
> z-(xl-xZ)'sqrI((s gma1^2'''nl)+(sJgna2^2''nZ))

[1] -1.749636
> BI pha=0. 0 S
> zalpha=qnorm(1-al pha.''2)
> zRl pha
[1] 1.959964
> f (abs (z} (zal pha)) (pr Jno "hypothes s ac c e pt ed") } el 3e(pr ñ nt " Hypothes s r e j e ct ed ") }
L1J "hypot:hesI s nc c e pm ed"
```