Practical No. 1

Aim: Basic of R - Software

i R is a software for statical analysis of data computing

ii It is an effective data handling software & outcome storage is possible

iii it is capable of graphical display.

Q1 Solve the following

1. $4+6+8\div2-5$
> 4+6+8÷2-5
[1] 9

2 $2^2+|-3|+\sqrt{45}$
> 2^2+abs(-3)+sqrt(45)
[1] 13.7082

3. $5^3+7\times5\times8+46/5$
> 5^3+5*7*8+46/5
[1] 414.2

4. $\sqrt{4^2+5\times3+7\div6}$
> sqrt(4^2+5*3+7/6
[1] 5.671567

5 round off
$46\div7+9\times8$
> (46/7+9*8) round
[1] 79

Q2
1] > c(2,3,5,7)*2
[1] 4 6 10 14

2] > c(2,3,5,7)*c(2,3)
[1] 4 9 10 21

3] > c(2,3,5,7)*c(2,3,6,2)
[1] 4 9 30 14

4] > c(1,6,2,3)*c(-2,-3,-4,-1)
[1] -2,-18,-8,-3

5] > c(2,3,5,7)^2
[1] 4 9 25 49

6] > c(4,6,8,9,4,5)^c(1,2,3)
[1] 4 36 512 9 16 125

7] > c(6,2,7,5)/c(4,5)
[1] 1.50 0.04 1.75 1

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No.

Q3

```
>x=20
> y= 30
> z= 2
> x^2 + y^3 + z
[1] 27402
> sqrt(x^2 + y)
[1] 20.73649
> x^z + y^z
[1] 1300
```

Q4

```
x <- matrix (nrow=4, ncol =2, data= c(1,2,3,4,5,6,7
>x          [1]  [2]
[1]  [1]     1    5
     [2]     2    6
     [3]     3    7
     [4]     4    8
```

Q5 Find x+y and 2x+3y where $x = \begin{bmatrix} 4 & -2 & 6 \\ 7 & 0 & 7 \\ 9 & -5 & 3 \end{bmatrix}$

$y = \begin{bmatrix} 10 & -5 & 7 \\ 12 & -4 & 9 \\ 15 & -6 & 5 \end{bmatrix}$



```
> x<- matrix (nrow = 3, ncol=3, data=c(4,7,9,-2,
  6,7,3))
>x          [1]  [2]  [3]
[1]  [1]     4   -2    6
     [2]     7    0    7
     [3]     9   -5    3
> y <- matrix (nrow=3 ,ncol=3 ,data=c(10,12,15,-5,-4,-6,7
> y         [1]  [2]  [3]
[1]  [1]    10   -5    7
     [2]    12   -4    9
     [3]    15   -6    5
> x+y
            [1]  [2]  [3]
[1]  [1]    14   -7   13
     [2]    19   -4   16
     [3]    24  -11   38
> 2*x + 3*y
            [1]  [2]  [3]
[1]  [1]    38  -19   33
     [2]    50  -12   41
     [3]    63  -28   21
```

Q6 Marks of Static CS Batch A

```
x=c(68, 20, 35, 24, 46, 56, 55, 45, 27, 22, 47, 58,
    54, 40, 50, 32, 36, 29, 35, 34)
x = c(data)
breaks = Seq(20, 60, 5)
a = cut(x, break, right= FALSE
b= table(x)
c = transform(b)
> c
      a       Freq
1  [20, 25)    3
2  [25, 30)    2
3  [30, 35)    1
4  [35, 40)    4
5  [40, 45)    1
6  [45, 50)    3
7  [50, 55)    2
8  [55, 60)    4
```

# Practical No. 2

Topic : Probability distribution

1. check weather following are pmf or nor

| x | P(x) |
|---|---|
| 0 | 0.1 |
| 1 | 0.2 |
| 2 | - 0.5 |
| 3 | 0.4 |
| 4 | 0.3 |
| 5 | 0.5 |

If the given data is pmf then $\Sigma P(x) = 1$

$\therefore P(0) + P(1) + P(2) + P(3) + P(4) + P(5) = P(x)$

$= 0.1 + 0.2 + -0.5 + 0.4 + 0.3 + 0.5$

$= 1$

$\therefore P(2) = -0.5$ It cannot be pmf function

$P(x) \geq 0 \quad \forall, x$

2

| x | P(x) |
|---|---|
| 1 | 0.2 |
| 2 | 0.2 |
| 3 | 0.3 |
| 4 | 0.2 |
| 5 | 0.2 |

The condition of pmf is $\Sigma P(x) = 1$

$\therefore P(1) + P(2) + P(3) + P(4) + P(5) = 1$

$= 1.1$

the given data $\Sigma P(x) \neq 1$

3)

| $x$ | $P(x)$ |
|---|---|
| 10 | 0.2 |
| 20 | 0.2 |
| 30 | 0.35 |
| 40 | 0.15 |
| 50 | 0.1 |

The condition of pmf is satisfy

$P(x) \geq 0 \quad \forall x$

$\Sigma P(x) = 1$

$\Sigma P(x) = P(10) + P(20) + P(30) + P(40) + P(50)$

$= 0.2 + 0.2 + 0.35 + 0.15 + 0.1$

$= 1$

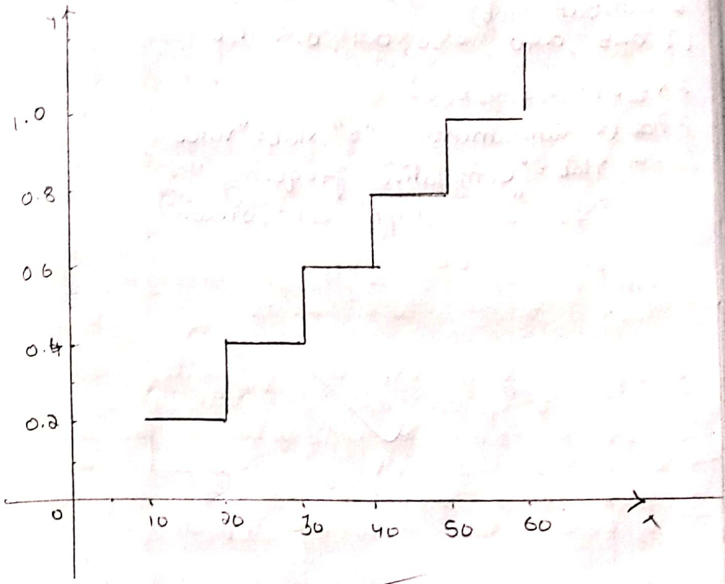
the given data is pmf.

Q2) Find the cdf for following pmf & sketch the graph

| $x$ | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| $P(x)$ | 0.2 | 0.2 | 0.35 | 0.15 | 0.1 |

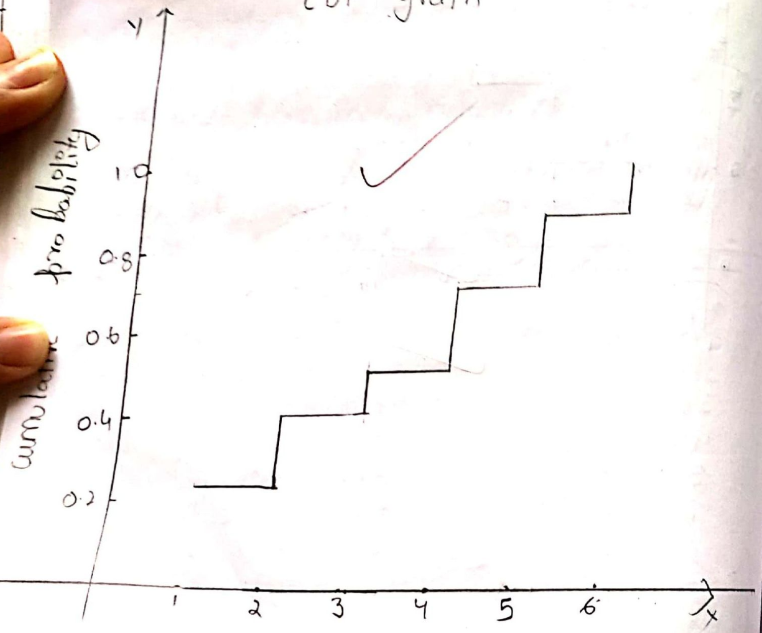
$$F_x = \begin{cases} 0 & x < 10 \\ 0.2 & 10 \leq x < 20 \\ 0.4 & 20 \leq x < 30 \\ 0.75 & 30 \leq x < 40 \\ 0.90 & 40 \leq x < 50 \\ 1 & x \geq 50 \end{cases}$$

```
> x = c(10,20,30,40,50)
> plot(x, cumsum(prob), "s")
```



```
> Prob = c(0.15, 0.25, 0.1, 0.2, 0.1)
> sum(Prob)
[1] 1
> cumsum(Prob)
[1] 0.15 , 0.40 , 0.50 , 0.7 , 0.9 , 1.0
> x = c(1, 2, 3, 4, 5, 6)
> Plot (x, cumsum(Prob), "s", xlab="Value",
    ylab = "Cumulative frequency"
    main = "CDF graph", col = "Brown")
```

CDF graph




ii Find

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $f(x)$ | 0.15 | 0.25 | 0.1 | 0.2 | 0.2 | 0.1 |

$$F(x) = \begin{cases} 0 & x < 1 \\ 0.15 & 1 \le x < 2 \\ 0.40 & 2 \le x < 3 \\ 0.5 & 3 \le x < 4 \\ 0.7 & 4 \le x < 5 \\ 0.90 & 5 \le x < 6 \end{cases}$$

3 Check that weather following is Pdf or not

i $f(x) = 3 - 2x \; ; \; 0 \le x \le 1$

ii $f(x) = 3x^2 \; ; \; 0 \le x \le 1$

i $f(x) = 3 - 2x$

$$\int_0^1 f(x)\,dx = \int_0^1 3 - 2x\,dx = \int_0^1 3\,dx - \int_0^1 2x\,dx$$

$$= 3[x]_0^1 - 2\left[\frac{x^2}{2}\right]_0^1$$

$$= 3 - 1$$

$$= 2$$

The $\int_0^1 f(x) \neq 1$ ∴ It is not Pdf

ii $f(x) = 3x^2$

$$\int_0^1 f(x)\,dx = \int_0^1 3x^2\,dx = 3\left[\frac{x^3}{3}\right]_0^1$$

$$\int_0^1 fx\,dx = 1$$

∴ The $\int_0^1 f(x) = 1$ ∴ It is Pdf

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Practical No. 3

Topic: Binomial distribution

# $P(x=x)$ = dbinom(x, n, p)
# $P(x \le x)$ = pbinom(x, n, p)
# $P(x>x)$ = 1 - pbinom(x, n, p)
if x is unknown
p1 = $P(x \le x)$ qbinom(p1, n, p)

1) Find probability of exactly 10 success in hundred trials with p = 0.1

2) Suppose there are 12 mcq each question has 5 option out of which 1 is correct. Find the probability of exactly
i) 4 correct answer
ii) atmost 4 correct answers
iii) more than 5 correct answer

3) Find the complete distribution when n=5 and p = 0.1

4) n=12 p=0.25 find the following probability (i) P(x=5) ii) P(x>7) iii) P(x < 5) iv) P(5<x<7)

40

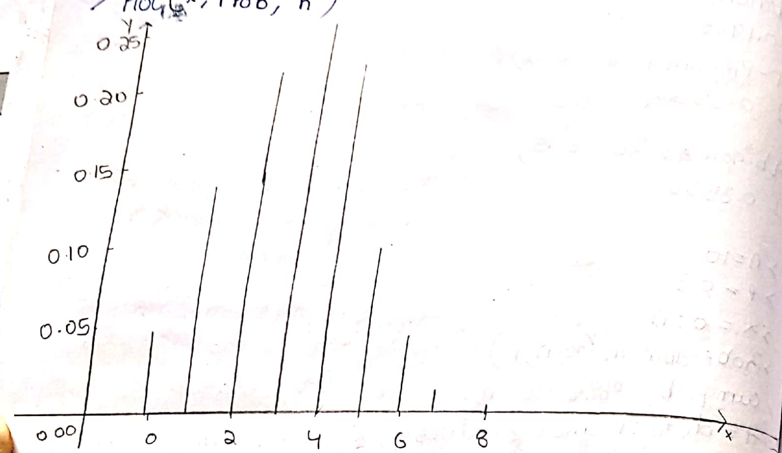
i) > pbinom (0, 10, 0.15)
[1] 0.1968
> 1 - pbinom (3, 20, 0.15)
[1] 0.3522

ii) > qbinom (3, 20, 0.15)
[1] 0.3522

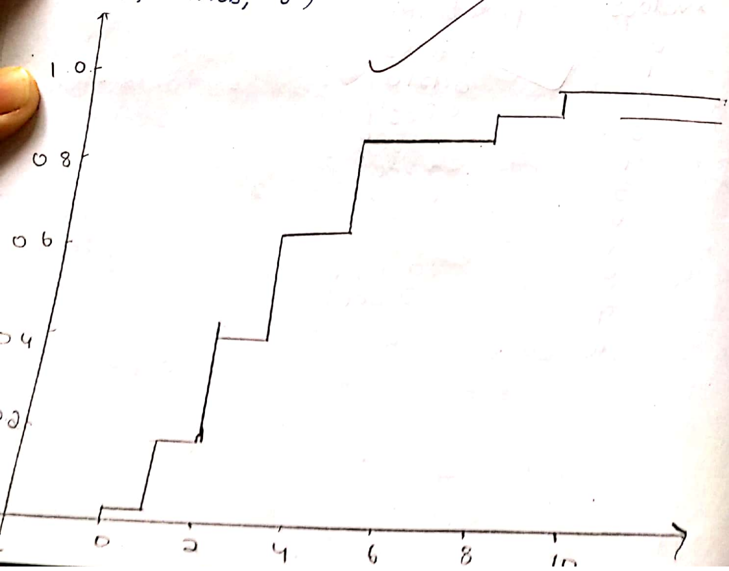
> n=10
> p = 0.3
> x = 0:n
> Prob = dbinom (x, n, p)
> cum prob = pbinom (x, n, p)
d = data.frame("xvalues", x, "Probability=", Prob)
Print d

| | xvalues | probability |
|---|---|---|
| 1 | 0 | 0.0282 |
| 2 | 1 | 0.1210 |
| 3 | 2 | 0.2334 |
| 4 | 3 | 0.2668 |
| 5 | 4 | 0.2001 |
| 6 | 5 | 0.1029 |
| 7 | 6 | 0.0367 |
| 8 | 7 | 0.0090 |
| 9 | 8 | 0.0014 |
| 10 | 9 | 0.0001 |
| 11 | 10 | 0.0000 |

> Plot(x, Prob, "h")




> Plot (x, cumProb, "s")






5 The probability of salesman making a sale to customer 0.15 find probability

i no sales out of 10 customer

ii more than 3 sales out of 20 customer.

6 A Sales man has 20% probability of making a sale to 30 customer & what minimum no. of sale he can make with 88% of probability

7) x follow binomial distribution with n=17 p=0.2 Plot graph of pmf & cdf

Practical No. 4

Topic Normal distribution

$P(x=x)$ = dbinom $(x, u, m)$
$p(x \leq x)$ = Pnorm $(x, u, z)$
$P(x > x)$ . 1 - Pnorm $(x, u, r)$

To random numbes from normal distributi in random number the code is rnorm

A random variable x follow normal distribution mean = 11.12 $ 'z' = 3
find i) $x \leq 15$ ii) $P(10 \leq x \leq 13)$ (iii) $P(x > 14)$

Good

code

```
P1= Pnorm(15,12,3)
> P1
[1] 0.8413447
> cat(" P(x <= 15) ," P1)
[1] P (x<=15) = 0.841377
> P2= Pnorm (13,12,13) - Pnorm(10,12,3)
> P2
[1] 0.3720661
> ~~cat (" Pnorm~~
> cat (" P(10 <=x<15) = ", P2)
> P(10<=x<15) = 0.3720661
> P3 = 1- P(norm)(14,12,3)
> P3
[1] 0.252725
> P4 = rnorm(5,12,3)
> P4
[1] 15.24723   16.28505   11.280515   6.419944
```

```
> P1 = Pnorm(7,10,2)
> P1
[1] 0.668072
> P2 = Pnorm(5,10,2) - Pnorm(12,10,2)
> P2
[1] 0.835135
> P3 = 1 - Pnorm(12,10,2)
> P3
[1] 0.1586553
> P4 = rnorm(10,10,2)
> P4
[1] 17.60893   9.920417   12.637741   8.073354   8.721308
    9.193706   9.366824   11.707106   9.537584   10.715006
> P5 = qnorm(4,10,2)
> P5
[1] 9.493306
```

Code

```
> rnorm(15,5,4)
[1] 10.7849   7.793249   9.953444   13.3457904
    17.5610668
> am = mean x
> am
[1] 8.7343
> m = median(x)
> Cat("median is = ", m)
median is = 10.76499
> n = 5
> v = (n-1)*var(x)/n
> v
[1] 11.09965
> SD = sqrt(v)
> SD
[1] 3.33163
> Cat("SD is = ", SD)
SD is = 3.331613
```



2 X follow normal distribution with $\mu = 10$ $\sigma = 2$ (i) $P(x < 7)$ (ii) $P(5 < x < 12)$ (iii) $P(x > 12)$
(iv) generate observation v. Find k such that $P(x < k) = 0.4$

3 Generate 5 random variable from normal distribution $\mu = 15$, $\sigma = 4$ find Sample mean median SD & Print it

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Q4 $x \sim N(30, 100)$ $\sigma = 10$

i) $P(x \leq 40)$ ii) $P(x > 35)$ iii] $P(25 < x < 35$

iv) find $k$ such that $P(x < k) = 0.6$

Q5 Plot the Standard

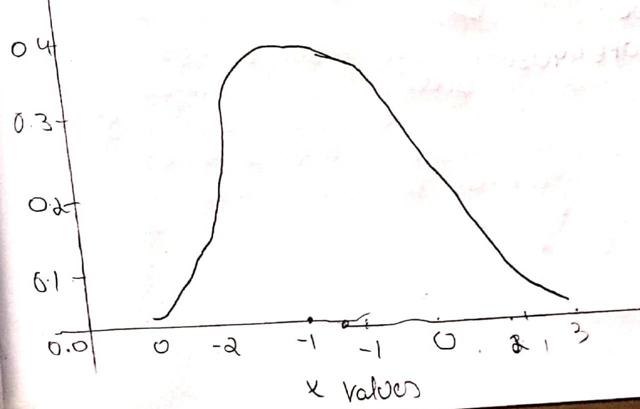


code

```
>f1 = Pnorm(40,30,10)
>f1
[1] 0.8413447
>f2 = 1-Pnorm(35,30,10)
>f2
[1] 0.3085375
>f3 = Pnorm(25,30,10) - Pnorm(35,30,10)
>f3
[1] 0.3085375
>f4 = qnorm(0.6,30,10)
>f4
[1] 32.53347
```

```
> x=seq(-3,3,by=0.1)
> y=dnorm(x)
> Plot(x, y, xlab="xvalues", ylab="Probability")
```

Standard Normal Graph



> mo = 15
> mx = 14
> n = 400
> Sd = 3
> Zcal = (mx - mo) / (Sd / (Sqrt (n)))
> Zcal
[1] 6.666667
> Cat ("Calculated value of z is", Zcal)
Calculated value of z is = -6.66667
> Pvalue = 2* (1- Pnorm(abs(Zcal)))
[1] 2.616796e-11

> mo = 10
> n = 400
> mx = 10.2
> Sd = 2.25
> Zcal = (mx - mo)/(Sd/(Sqrt(n)))
> Zcal
[1] 1.77778
> Pvalue = 2* (1- Pnorm(abs(Zcal)))
> P-value
[1] 0.07544036



# Pratical No. 5 & 6

Topic : normal & T. test & large sample test

Ho : μ = 15 (null) H₁ : μ ≠ 15 alternative

Q Test the hypothesis Random sample of size 400 is drawn and it is calculated. the sample mean is 14 AND SD is 13 test the hypothesis at 5% Level of significance

\# 0.05 > accept the value
\# 0.05 > less then reject

∴ The value ~~will be~~ less than 0.05 we will reject the value of Ho = μ = 15

Q Test the hypothesis Ho = μ = 10 against H₁ : μ ≠ 10. A random sample size of 400 is drawn with sample mean = 10.2 SD = 2.25 Test the hypothesis at

the Pvalue is greater 0.5
∴ The value accepted

3 Test the hypothesis Ho: Proportional of Smoker in College is 0.2. A Sample is Collected & Calculated the sample Porportion as 0.125. Test hypothesis at 5% level of Significana

the value will be rejected

4 In a Sample of 600 student in clg 400 to use blue ink. In another clg from Sample of 900 Student 450 use blue ink. Test the hypothesis that proportion of student using blue ink in 2 clg are equal or not 1% level of significana

The value will be rejected

5) A random size sample size of 1000 & 2000 are drawn from 2 population with Same Sd = 2.5 & sample mean are 67.5 & 68 ∴ $\mu_1 = \mu_2$ at 5% level of significana

```
>P= 0.2
>p= 0.125
>n= 400
>Q= 1-P
>Zcal= (p-P)/(sqrt(P*Q/n))
>cat("The calculated z value is =",zcal)
the calculated value of z is = -3.75
> Pvalue = 2* (1- Pnorm(abs(zcal)))
> Pvalue
[1] 0.000176846
```

5

```
> n1 = 1000
> n2 = 2000
> Mx1 = 67.5
> mx2 = 68
> sd1 = 2.5
> sd2 = 2.5
> Zcal = (mx1 -Mx2)/(sqrt(sd1^2/n1) + (sd2^2/n2))
> ZCal
[1] 5.16378
> Pvalue= 2(1-pnorm(abs(zcal))
> PValue
[1] 2.41756e-07
```

4. A Study of noise level in 2 hospital is given below test & claim that 2 hospital have Some value of noise at 1% level

| | HOS A | HOS B |
|---|---|---|
| | 84 | 34 |
| | 61.9 | 59.4 |
| | 7.9 | 7.5 |

> n1 = 84
> n2 = 34
> Mx1 = 59.4
> Mx2 = 61.2
> Sd1 = 7.9
> Sd2 = 7.5
> Zcal = (mx2 - Mx1)/sqrt((sd1^2/n1) + (sd2^2/n2))
> Zcal
[1] 1.162528
> Pvalue = 2*(1-pnorm(abs(Zcal))
> Pvalue
[1] 0.2450211

The value is greater than 0.01 all accept value

5) $H_0 : P_1 = P_2$ against $H_1 : P_1 \neq P_2$

> n1 = 600
> n2 = 400
> P1 = 400/600
> P2 = 450/900
> P = (n1*P1 + n2*P2)/(n1+n2)
> P
[1] 0.566677
> q = 1-P
> q
[1] 0.43333



> zcal = (P1-P2)/sqrt(P*q*(1/n1 + 1/n2))
> zcal
[1] 6.381534
> Pvalue = 2*(1-pnorm(abs(zcal)))
> Pvalue
[1] 1.75322e-10

The value is less than 0.01 the value rejected

7) $H_0 : P_1 = P_2$ against $H_1 : P_1 \neq P_2$

> n1 = 200
> n2 = 200
> P1 = 44/200
> P2 = 30/200
> P = (n1*P1 + n2*P2)/(n1+n2)
> P
[1] 0.185
> q = 1-P
> q
[1] 0.815
> Zcal = (P1 - P2)/sqrt(P*q*(1/n1 + 1/n2))
> Zcal
[1] 1.802741
> Pvalue = 2*(1- pnorm(abs(Zcal)))
> Pvalue
[1] 0.0714288

4. A study of noise level below test 8 claim that 2 hospital give some value of noise at 1% level to

>n1 = 84
> n2 = 34
> Mx1 = 59.4
> Mx2 = 61.2
> Sd1 = 7.9
> Sd2 = 7.5

| | HOS A | HOS B |
|---|---|---|
| | 84 | 34 |
| | 61.9 | 59.4 |
| | 7.9 | 7.5 |

>Zcal = (mx2 - Mx1)/sqrt((sd1^2/n1) + (sd2^2/n2))
> Zcal
[1] 1.162328
> Pvalue = 2*(1-pnorm(abs(Zcal)))
> Pvalue
[1] 0.2450211

The value is greater than 0.01 all accept value

5) $H_0: P_1 = P_2$ against $H_1: P_1 \neq P_2$
>n1 = 600
>n2 = 400
>P1 = 400/600
>P2 = 450/900
> P = (n1*P1 + n2*P2)/(n1+n2)
> P
[1] 0.566677
> q = 1-P
> q
[1] 0.43333



> zcal = (P1-P2)/sqrt(P*q*(1/n1 + 1/n2))
> zcal
[1] 6.381534
> Pvalue = 2*(1-pnorm(abs(zcal)))
> Pvalue
[1] 1.75322e-10
The value is less than 0.01 the value rejected

7) $H_0: P_1 = P_2$ against $H_1: P_1 \neq P_2$
> n1 = 200
> n2 = 200
> P1 = 44/200
> P2 = 30/200
> P = (n1*P1 + n2*P2)/(n1+n2)
> P
[1] 0.185
> q = 1-P
> q
[1] 0.815
> zcal = (P1 - P2)/sqrt(P*q*(1/n1 + 1/n2))
> zcal
[1] 1.802741
> Pvalue = 2*(1 - pnorm(abs(zcal)))
> Pvalue
[1] 0.0714288

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Practical no. 6

Aim:- Larger sampler test

8 Let the population mean (a amount spent per customer in ~~restaurant~~ restaurant) is 250. A sample of hundred customer selected the sample mean is calculated as 275 and sd = 30 Test the hypotesis that population mean is 250 or not on 5% level of significance

⇒ The value is less than 0.05 we reject the value of $H_0 = \mu = 250$

Q. In a random sample of 1000 student it is found the 150 use blue pen. test of hypothesis that the population proportion is 0.8 at 1% level of significance

- The value will be rejected because value is less 0.01



```
>mo = 250
>mx = 275
> sd = 30
> n= 100
>zcal (mx-mo) /(sd/sqrt(n)))
> cat ("the calculated value of z is ", zcal)
[1] the calculated value of z = 8.333333
>Pvalue = 2* (1- pnorm(abs(zcal)))
> pvalue
[1] 0
```

```
Q> p = 0.8
> q = 1-p
> p = 750/1000
>n=1000
>z0=(P-p ) /sqrt(p* q/n))
> Cat("the calculated the value of Z is= ", zcal)
[1] the calculated value of z is = -3.952847
> Pvalue = 2*(1-Pnorm(abs(zcal)))
> Pvalue .
[1] 7.72268e-05
```

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>P = 0.2
>p = 9/60
>n = 60
> zcal = (p-P)/sqrt(P*q/n))
> z cal
[1] 0.9682458
>pvalue = 2(1- pnorm(abs(zcal)))
> pvalue
0.332916

x=c(12.25, 11.97, 12.15, 12.08, 12.31, 12.28, 11.94, 11.89, 12.16, 12.04)
> n= length(x)
>n
[1] 10
> Mx = mean x
> Mx
[1] 12.107
> varience = (n-1)*var(x)/n
> varience
[1] 0.019521
> sd = sqrt (varience)
> sd
[1] 0.1397176
> MO= 12.5



10) last year farmer lost 20% of crop. A random sample of 60 feild are collected & it is found 9 feild is insect population Test of hypothesis at 1% level of significance

this value will be accepted

11) Test of hypothesis H0: μ = 12.5 from following sample at 5% level of significance

> t = (mx - mo)/(sd/sqrt(n))
> t
[1] -8.894909
>pvalue = 2* (1- pnorm(abs(t)))
> pvalue
[1] 0
The value is less than 0.05 the value is accepted

Practical No. 7

Small sample test

The mark of 10 student are given 63, 63, 66, 67, 68, 69, 70, 71, 72 test of hypothesis that sample come from population with avg 66

H: $\mu = 66$

The pvalue ~~test~~ is less than 0.05 we reject the hypothesis at 5% level of significance

Two group student scored the following mark the test of hypothesis that there is no significance difference between 2 group

gr1 = 18, 22, 27, 21, 17, 20, 17, 23, 20, 21, 22
gr2 = 16, 20, 14, 21, 20, 18, 13, 15, 17, 21

Ho There is not diff btw 2 group



```
> x=c(66,63,66,67,68,69,70,71,72)
> t.Test (x)
one sample test
data : x
t = 68.319 , df = 9 , Pvalue = 1.558e-13
alternative hypothesis : True means not equal to 0
95% level of significance
65.6571        70.14829
sample estimate
mean of x
67.9
```

---

```
gr1 = c(18,22,21,27, 20,17,23,20,22,21)
gr2 = c (16, 20, 14, 21, 20, 18, 13, 15, 17, 21)
t.test(gr1, gr2)
        welsh Two sample test
data gr1 & gr2
t = 2.573     df = 16.376     Pvalue = 0.03798
alternative hypothesis = The diff means not equal to 0
95% confidence interval:
0.1628205        5.077795
mean of x & y
20.1        17.5
> Pvalue = 0.03798
> if(Pvalue >0.05) {cat ("accep no")}
   else { cat ("reject no")}
[1] reject no
```

> y = c(55, 29, 30, 55, 56, 45)
> t.test(x, y, paired = T, alternative = "greater")
Paired t-test

data: x & y
t = -2.7815, df = 5, pvalue = 0.9806
alternative hypothesis: true difference means greater than 0
95% confidence level
-6.035547 inf
Sample estimate
mean of diff
-3.5

Ho: there is no significance difference
x = c(120, 125, 115, 130, 123, 119)
y = c(100, 114, 95, 90, 115, 99)
t.test(x, y, Paired = t, alter = "less")
Paired t-test

data: x & y
t = 4.3458  df = 5, Pvalue = 0.9969
alternative hypothesis: true difference means less than 0
95% confidence level
inf 09.0295



3. the sales data of 36 shop before & after are given below
x = 53, 28, 31, 48, 50, 42
y = 58, 29, 30, 55, 56, 45
Test the hypothesis the campaign is effective or not

→ Pvalue is greater than 0.05 we accept hypothesis at 5% level of significance

4. If following are weights before & after the diet prog
diet A = 120, 125, 115, 130, 123, 119
diet B = 100, 114, 95, 90, 115, 99

→ Pvalue is greater than 0.05. The value will accept the hypothesis at 5% of significance

2 medians are applied to 2 group of Patict respectively

gr1 = 10, 12, 13, 11, 14

gr2 : 8, 9, 12, 14, 15, 10, 9

If there is any significance difference between 2 median

Ho: There is no significance difference

x = c (10, 12, 13, 11, 14)

Y = c (8, 9, 12, 14, 15, 10, 9)

t. test (x, y)

data: x & y

t = 0.803841, df = 9.7594, Pvalue = 0.0446

alter hypothesis : true significance in means is not equal to 0

95 % of confidence interval

0.9698833 4.2981886

Sample estimate

mean of x mean of y

12.000 10.3333

∴ Pvalue is grater than 0.05 we accept the hypothesis at 5 % level of significance

4 Ho: μ = 100 against H₁ : μ ≠ 100
> var = 64
> n = 400
mo = 100
mx = 900
Sd = sqrt (var)
zCal = (mx - mo)/(sd/(sqrt(n)))
Sd
[1] 8
[1] > zcal
-2.5
> Pvalue = 2* (1-Pnorm (abs(zcal)))
> Pvalue
[1] 0.01241933
Pvalue is less than 0.05 we reject at 5% level of significance

5) Ho : μ=66 against H₁: μ ≠ 66
> x = c (63, 68, 63, 69, 71, 71, 72)
> t. test
one sample test
data : x
t = 47.94 df = 6 , P-value = 5.522e-09
Alternative hypothesis : true means is not equal to 0
95 Percent Confidence interval
64.6679 71.6202
Sample estimate
mean of x - 68.14286



6 Ho : σ₁ = σ₁ against H₁: σ₁ = σ₂
> x = c(66, 67, 75, 76, 82, 88, 90, 92)
> y = c(64, 66, 74, 78, 82, 85, 87, 92, 93, 95, 97)
> var. test (x, y)
F-test to compare two varience
data x and y
F = 0.788803 , num df = 7 , dnom df = 10, P.value = 0.7752
Alternative hypothesis : true ratio of variance is not equal to 1
95% percent level
0.199509 3.751881
Sample estimate :
ratio of varience
0.7880259

7] Ho: μ=1150 against H₁: μ ≠ 1150
> n = 8000
> mx = 1150
> mo = 1200
> s.d = 125
> zCal = (mx - mo)/(sd/sqrt(n))
> zCal
-4
> Pvalue . 2* (1 - Pnorm (abs(zcal)))
> Pvalue
[1] 6.334248e-05
Pvalue is less than 0.05 we reject Ho

8) $H_0: P_1 = P_2$ against $H_1: P_1 \neq P_2$

```
> n1 = 200
> n2 = 300
> p1 = 44/200
> p2 = 56/300
> p = (n1* p1 + n2* p2)/(n1+n2)
> p
[1] 0.2
> q = p-1
[1] 0.8
> zcal = (p1-p1)/sqrt(p* q* (1/n1 + 1/n2))
> zcal
[1] 0.9128709
> pvalue = 2 *(1-pnorm(abs(zcal)))
> p-value
0.3163104
```

Pvalue is greater than 0.05 ~~acc~~ accept Ho at 1% level of significance