

NORMAL DISTRIBUTION in RStudio

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Aim-To Study Normal Distribution in R

Code-

```
x=seq(-3,3,length=200)
```

```
y=dnorm(x,mean=0,sd=1)
```

```
plot(x,y,type="l")
```

```
x=seq(-3,0, length=100)
```

```
y=dnorm(x,mean=0,sd=1)
```

```
polygon(c(-3,x,0),c(0,y,0),col="red")
```

```
pnorm(0,mean = 0,sd=1)
```

```
x=seq(-3,3, length=200)
```

```
y=dnorm(x,mean=0,sd=1)
```

```
plot(x,y,type = "l")
```

```
x=seq(-3,1, length=100)
```

```
y=dnorm(x,mean=0,sd=1)
```

```
polygon(c(-3,x,1),c(0,y,0),col = "blue")
```

```
pnorm(1,mean = 0, sd=1)
```

```
x=seq(2,3,length=100)
y=dnorm(x=mean=0,sd=1)
polygon(c(2,x,3),c(0,y,0),col = "blue")
1-pnorm(2,mean = 0,sd=1)
```

```
xbar=9900
mu0=10000
sigma=120
n=30
z=(xbar-mu0)/(sigma/sqrt(n))
z
alpha=0.05
zalpha=qnorm(1-alpha)
-zalpha
pval=pnorm(z)
pval
```

```
xbar=2.1
mu0=2
sigma=0.25
n=35
```

$z = (\bar{x} - \mu_0) / (\sigma / \sqrt{n})$

z

$\alpha = 0.05$

$z_{\alpha} = qnorm(1 - \alpha)$

z_{α}

$pval = pnorm(z)$

pval

$1 - pval$

$\bar{x} = 14.6$

$\mu_0 = 15.4$

$n = 35$

$\sigma = 2.5$

$z = (\bar{x} - \mu_0) / (\sigma / \sqrt{n})$

z

$\alpha = 0.05$

$z_{\alpha/2} = qnorm(1 - \alpha/2)$

$c(-z_{\alpha/2}, z_{\alpha/2})$

$pval = 2 * pnorm(z)$

pval

p=85/148

P=60/100

n=148

Q=1-P

z=(p-P)/sqrt(P*Q/n)

z

alpha=.05

zalpha=qnorm(1-alpha)

zalpha

pval=pnorm(z)

pval

p=30/214

p0=12/100

q0=1-p0

n=214

z=(p-p0)/sqrt(p0*q0/n)

z

alpha=0.05

```
zalpha=qnorm(1-alpha)
```

```
zalpha
```

```
pval=pnorm(z,lower.tail = FALSE)
```

```
pval
```

```
p=18/30
```

```
P=1/2
```

```
n=30
```

```
Q=1-P
```

```
z=(p-P)/sqrt(P*Q/n)
```

```
z
```

```
alpha=.05
```

```
pval=pnorm(z,lower.tail = FALSE)
```

```
pval
```

```
zhalfalpha=qnorm(1-alpha/2)
```

```
zhalfalpha
```

```
x=c(0.593,0.142,0.329,0.691,0.231,0.793,0.519,0.  
.392,0.418)
```

```
xbar=mean(x)
```

```
alpha=.05
```

```
mu=.3
sd=sqrt(var(x))
n=length(x)
t=(xbar-mu)/(sd/sqrt(n))
t
tv=qt(1-alpha,df=n-1)
tv
```

```
x=c(65,78,88,55,48,95,66,57,79,81)
xbar=mean(x)
sd=sqrt(var(x))
mu=75
alpha=.05
n=length(x)
t=(xbar-mu)/(sd/sqrt(n))
t
tv=qt(1-(alpha/2),n-1)
tv
```

Output-

```
> x=seq(-3,3,length=200)
```

Warning message:

In seq.default(-3, 3, lenght = 200) :

extra argument 'lenght' will be disregarded

```
> y=dnorm(x,mean=0,sd=1)
```

```
> plot(x,y,type="l")
```

```
> x=seq(-3,0, lenght=100)
```

Warning message:

In seq.default(-3, 0, lenght = 100) :

extra argument 'lenght' will be disregarded

```
> y=dnorm(x,mean=0,sd=1)
```

```
> polygon(c(-3,x,0),c(0,y,0),col="red")
```

```
> pnorm(0,mean = 0,sd=1)
```

```
[1] 0.5
```

```
> x=seq(-3,3, lenght=200)
```

Warning message:

In seq.default(-3, 3, lenght = 200) :

extra argument 'lenght' will be disregarded

```
> y=dnorm(x,mean=0,sd=1)
```

```
> plot(x,y,type = "l")
```

```
> x=seq(-3,1, length=100)
```

Warning message:

In seq.default(-3, 1, length = 100) :

extra argument 'length' will be disregarded

```
> y=dnorm(x,mean=0,sd=1)
```

```
> polygon(c(-3,x,1),c(0,y,0),col = "blue")
```

```
> pnorm(1,mean = 0, sd=1)
```

```
[1] 0.8413447
```

```
> x=seq(2,3,length=100)
```

Warning message:

In seq.default(2, 3, length = 100) :

extra argument 'length' will be disregarded

```
> y=dnorm(x=mean=0,sd=1)
```

```
Error: unexpected '=' in  
"y=dnorm(x=mean="
```

```
> polygon(c(2,x,3),c(0,y,0),col = "blue")
```

```
Error in xy.coords(x, y, setLab = FALSE) :  
'x' and 'y' lengths differ
```

```
> 1-pnorm(2,mean = 0,sd=1)
```



```
[1] 0.02275013
```

```
>
```

```
> xbar=9900
```

```
> mu0=10000
```

```
> sigma=120
```

```
> n=30
```

```
> z=(xbar-mu0)/(sigma/sqrt(n))
```

```
> z
```

```
[1] -4.564355
```

```
> alpha=0.05
```

```
> zalpha=qnorm(1-alpha)
```

```
> -zalpha
```

```
[1] -1.644854
```

```
> pval=pnorm(z)
```

```
> pval
```

```
[1] 2.505166e-06
```

```
>
```

```
> xbar=2.1
```

```
> mu0=2
```

```
> sigma=0.25
> n=35
> z=(xbar-mu0)/(sigma/sqrt(n))
> z
[1] 2.366432
> alpha=0.05
> zalpha=qnorm(1-alpha)
> zalpha
[1] 1.644854
> pval=pnorm(z)
> pval
[1] 0.9910198
> 1-pval
[1] 0.008980239
>
>
>
> xbar=14.6
> mu0=15.4
```

```
> n=35
> sigma=2.5
> z=(xbar-mu0)/(sigma/sqrt(n))
> z
[1] -1.893146
> alpha=0.05
> zhalfalpha=qnorm(1-alpha/2)
> c(-zhalfalpha,zhalfalpha)
[1] -1.959964  1.959964
> pval=2*pnorm(z)
> pval
[1] 0.05833852
>
> p=85/148
> P=60/100
> n=148
> Q=1-P
> z=(p-P)/sqrt(P*Q/n)
> z
```

```
[1] -0.6375983
```

```
> alpha=.05
```

```
> zalpha=qnorm(1-alpha)
```

```
> zalpha
```

```
[1] 1.644854
```

```
> pval=pnorm(z)
```

```
> pval
```

```
[1] 0.2618676
```

```
>
```

```
> p=30/214
```

```
> p0=12/100
```

```
> q0=1-p0
```

```
> n=214
```

```
> z=(p-p0)/sqrt(p0*q0/n)
```

```
> z
```

```
[1] 0.908751
```

```
> alpha=0.05
```

```
> zalpha=qnorm(1-alpha)
```

```
> zalpha
```

```
[1] 1.644854
```

```
> pval=pnorm(z,lower.tail = FALSE)
```

```
> pval
```

```
[1] 0.1817408
```

```
>
```

```
> p=18/30
```

```
> P=1/2
```

```
> n=30
```

```
> Q=1-P
```

```
> z=(p-P)/sqrt(P*Q/n)
```

```
> z
```

```
[1] 1.095445
```

```
> alpha=.05
```

```
> pval=pnorm(z,lower.tail = FALSE)
```

```
> pval
```

```
[1] 0.1366608
```

```
> zhalfalpha=qnorm(1-alpha/2)
```

```
> zhalfalpha
```

```
[1] 1.959964
```

>

>

```
x=c(0.593,0.142,0.329,0.691,0.231,0.793,0.519,0.392,0.418)
```

```
> xbar=mean(x)
```

```
> alpha=.05
```

```
> mu=.3
```

```
> sd=sqrt(var(x))
```

```
> n=length(x)
```

```
> t=(xbar-mu)/(sd/sqrt(n))
```

```
> t
```

```
[1] 2.205059
```

```
> tv=qt(1-alpha,df=n-1)
```

```
> tv
```

```
[1] 1.859548
```

>

```
> x=c(65,78,88,55,48,95,66,57,79,81)
```

```
> xbar=mean(x)
```

```
> sd=sqrt(var(x))
```

```
> mu=75
```

```
> alpha=.05
```

```
> n=length(x)
```

```
> t=(xbar-mu)/(sd/sqrt(n))
```

```
> t
```

```
[1] -0.7830291
```

```
> tv=qt(1-(alpha/2),n-1)
```

```
> tv
```

```
[1] 2.262157
```







