Normal Distribution in RUN and STAT mode.

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Normal Distribution.

Select **RUN** mode from the **Main Menu** by using the arrow keys to highlight the RUN icon or pressing 1.

OPTN key   **F6** key

F3 key   **F6** key

P(calculates the Normal Distribution probabilities from the LEFT tail.

Q(calculates the Normal Distribution probabilities from the MEAN (μ) = 0

[Note: Where the value entered has to be $\geq$ 0. A new feature of the FX9750Gii.]

R(calculates the Normal Distribution probabilities from the RIGHT tail.

Example:

(a)   Calculate Prob($0 < Z < 1.5$)   (b)   Calculate Prob($Z < -2.5$)

(c)   Calculate Prob($1 < Z < 2.75$)   (d)   Calculate Prob($Z > -1.86$)

Answer:

(a)
```
Q(1.5)
          0.4331927987
```

(b)
```
P(-2.5)
          0.00620966532
```

(c)
```
Q(2.75)-Q(1)
          0.1556754907
```

(d)
```
R(-1.86)
          0.968557237
```

To get the Normal Distribution graph drawn and the associated probability,
Graph Y = P(or Graph Y = Q(or Graph Y = R(
has to be brought up on to the screen.

```
Graph Y=
```

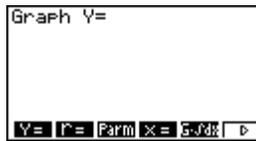[**SHIFT**]   [**F4**]   [**F5**]   [**F1**]

Example: Sketch and find the probability Prob($0 < Z < 1.5$)

[SHIFT] [F4] [F5] [F1] gives on the screen.

```
Graph Y=



Y= r= Parm x= G-∂dx ▷
```
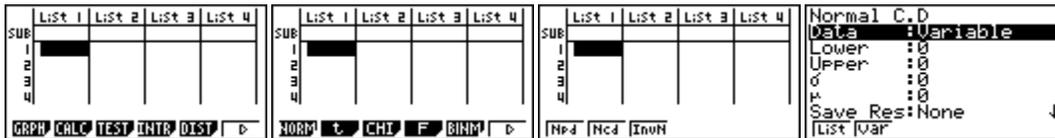
Then repeat the example above to retreive **Q(**

[OPTN] [F6] [F3] [F6] then **[1] [.] [5] [)]** then **[EXE].**

```
Graph Y=Q(1.5)



P( Q( R( t(    ▷
```

```



Q(t)=0.4331927987
```
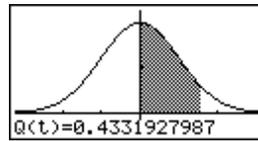
Now in STAT mode from the Main Menu.

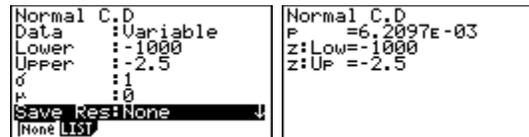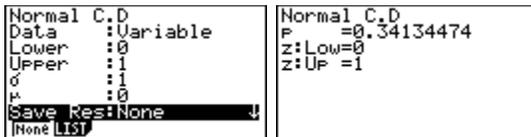Select **STAT** mode from the main menu by using the arrow keys to highlight the STAT icon or pressing 2.

```
        MAIN MENU
RUN-MAT STAT  GRAPH DYNA


TABLE RECUR CONICS EQUA


PRGM  TVM  E-CON2 LINK

```

```
   List 1 List 2 List 3 List 4
SUB
 1
 2
 3
 4
GRPH CALC TEST INTR DIST  ▷
```
```
   List 1 List 2 List 3 List 4
SUB
 1
 2
 3
 4
NORM  t  CHI  F  BINM  ▷
```
```
   List 1 List 2 List 3 List 4
SUB
 1
 2
 3
 4
Npd  Ncd  InvN
```
```
Normal C.D
Data    :Variable
Lower   :0
Upper   :0
σ       :0
μ       :0
Save Res:None        ↓
List Var
```
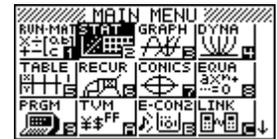
Entry from the **MAIN MENU** **[F5]** for **DIST**ributions **[F2]** for **N**ormal **C**umulative **D**istribution **Ncd**
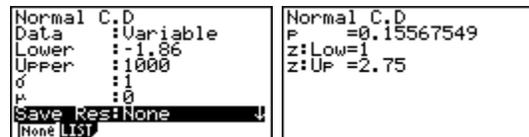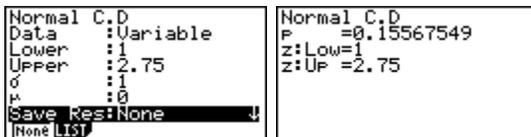
Examples for $\sigma = 1$ and $\mu = 0$:

(a) Calculate Prob($0 < Z < 1.5$)

```
Normal C.D
Data    :Variable
Lower   :0
Upper   :1
σ       :1
μ       :0
Save Res:None        ↓
None LIST
```
```
Normal C.D
P      =0.34134474
z:Low=0
z:Up =1
```

(b) Calculate Prob($Z < -2.5$)

```
Normal C.D
Data    :Variable
Lower   :-1000
Upper   :-2.5
σ       :1
μ       :0
Save Res:None        ↓
None LIST
```
```
Normal C.D
P      =6.2097ε-03
z:Low=-1000
z:Up =-2.5
```

(c) Calculate Prob($1 < Z < 2.75$)

```
Normal C.D
Data    :Variable
Lower   :1
Upper   :2.75
σ       :1
μ       :0
Save Res:None        ↓
None LIST
```
```
Normal C.D
P      =0.15567549
z:Low=1
z:Up =2.75
```

(d) Calculate Prob($Z > -1.86$)

```
Normal C.D
Data    :Variable
Lower   :-1.86
Upper   :1000
σ       :1
μ       :0
Save Res:None        ↓
None LIST
```
```
Normal C.D
P      =0.15567549
z:Low=1
z:Up =2.75
```

Using the **z-score** transformation $z = \dfrac{X - \mu}{\sigma}$

Example for $\sigma \neq 1$ and $\mu \neq 0$: Calculate the probability that a student scores an A bursary (a score $> 65\%$) where the mean is 55% and the standard deviation is 17%. [Assuming the Normal Distribution to model your answer.]

```
Graph Y=R((65-55)÷17)



P( Q( R( t(    ▷
```
```



R(t)=0.2781871852
```
```
Normal C.D
Data    :Variable
Lower   :65
Upper   :1000
σ       :17
μ       :55
Save Res:None        ↓
None LIST
```
```
Normal C.D
P      =0.27818718
z:Low=0.58823529
z:Up =55.5882353
```
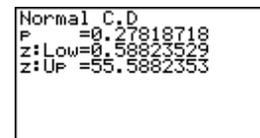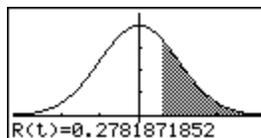
In **RUN** mode.   In **STAT** mode

[**N.B.** To work through a number of Normal Distribution problems, after each completed question and answer, press EXIT to move back to the previous window where you can enter the upper and lower bounds for the next normal distribution problem.]