

Distr Draw Functions: ShadeNorm

Find the area under the density curve for a Normal Distribution and display a graph.
We will compute $P(60 \leq X \leq 66)$ for the $N(63.6, 2.5)$ distribution.

Keystrokes

Screen

ShadeNorm draws the normal density function specified by μ and σ and shades the area between *lowerbound* and *upperbound*. From the home screen, press **2nd** **VAR**.

Press 

Press **ENTER**

Note: you can also select option 1 directly by pressing **1**

The format for the input of **ShadeNorm** is:
(*lowerbound*, *upperbound*, μ , σ)

For this example, enter the following:

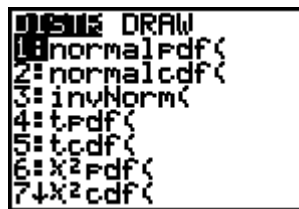
60 **,** 66 **,** 63.6 **,** 2.5 **)**

Press **ENTER**

Thus, the area under the curve for the normal distribution with mean $\mu = 63.6$ and $\sigma = 2.5$ from $X = 60$ to $X = 66$ is .756539.

The WINDOW dimensions for this result is the standard viewing window: $X_{\min} = -10$, $X_{\max} = 10$, $X_{\text{scl}} = 1$, $Y_{\min} = -10$, $Y_{\max} = 10$, $Y_{\text{scl}} = 1$. If you want to see the graph of the shaded bell curve, you need to modify the WINDOW dimensions (see back).

Note: even though you may not be able to see a graph of the bell curve, you can still use the results and interpret as a probability. In this example the probability is approximately 75.65%.




```
DISTR DRAW
1:normalpdf(
2:normalcdf(
3:invNorm(
4:tpdf(
5:tcdf(
6:x²pdf(
7↓x²cdf(
```



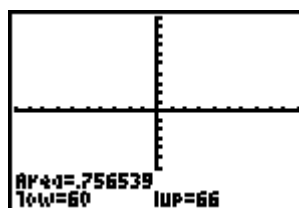
```
DISTR DRAW
1:ShadeNorm(
2:Shade_t(
3:Shade_x²(
4:ShadeF(
```



```
ShadeNorm(
```



```
ShadeNorm(60,66,
63.6,2.5)
```



```
AREA=.756539
low=60 up=66
```

More questions? Contact the **Metropolitan State University Math Center** at
651-793-1460, 651-793-1463 (Fax) or math.center@metrostate.edu.

Keystrokes

Screen


We can change the settings of the WINDOW in order to view the shaded bell curve of the normal distribution. This involves some experimentation; try different values until you see something you like!






Press 

```

WINDOW
Xmin=10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1

```

For each dimension, enter the following, pressing  after each calculation:

Xmin = 63.6  4  2.5
 Xmax = 63.6  4  2.5
 Xscl = 2.5
 Ymin =  .05
 Ymax = 0.2
 Yscl = 0
 Xres = 1



```

WINDOW
Xmin=53.6
Xmax=73.6
Xscl=2.5
Ymin=-.05
Ymax=.2
Yscl=0
Xres=1

```

Note: since the 68-95-99.7 rule tells us that 99.7% of the data is contained within 3 standard deviations of the mean, we will look at a window that shows more: 4 standard deviations on either side of the mean.


$X_{min} = \mu - 4\sigma$ (4 standard deviations below the mean)
 $X_{max} = \mu + 4\sigma$ (4 standard deviations above the mean)
 $X_{scl} = \sigma$ (this will place a tick-mark at every standard deviation)
 Y_{min} = small, negative number; you may need to experiment.
 Y_{max} = small, positive number; you may need to experiment.
 $Y_{scl} = 0$ (no tick marks will be visible)

Press   to exit the WINDOW settings

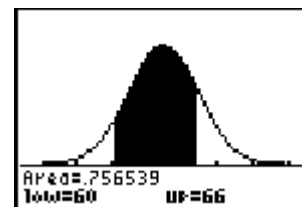
```

ShadeNorm(60, 66,
63.6, 2.5)

```

Press  to reactivate the ShadeNorm function as we entered previously.

The probability $P(60 \leq x \leq 66)$ for a $N(63.6, 2.5)$ distribution is approximately 75.75%



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