

TI-83 & TI-84: Normal Distribution Calculations

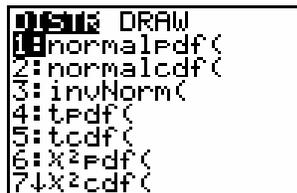
The following pages contain some instructions on the usage of the TI-83/84 graphing calculators.

The examples used below are taken out of David Moore's text titled "The Basic Practice of Statistics, 2nd Edition".

Example#1.16 p. 59: The level of cholesterol in the blood is important because high cholesterol levels may increase the risk of heart disease. The distribution of blood cholesterol levels in a large population of people of the same age and sex is approximately normal. For 14-year-old boys, the mean is $\mu=170$ milligrams of cholesterol per deciliter of blood (mg/dl) and the standard deviation is $\sigma=30$ mg/dl. The blood cholesterol levels above 240 mg/dl may require medical attention. What percent of 14-year-old boys have more than 240 mg/dl of blood cholesterol level?

Use x to represent the level of cholesterol in the blood. The variable x has a normal distribution, which is denoted by $N(170,30)$. What needs to be computed is the proportion of boys with $x>240$. This can be computed by finding the area under the $N(170,30)$ density curve between the lower bound value of a and the upper bound value of b with the command **normalcdf(a, b, 170, 30)**.

Start out from the Home screen. Press **2nd** and **VAR** to access the DISTR menu. At this point, your screen should look like the screen on the left given below.



```
0:QUIT DRAW
1:normalcdf(
2:normalcdf(
3:invNorm(
4:tcdf(
5:tcdf(
6:X²cdf(
7:X²cdf(
```



```
normalcdf(
```

Press **↓** to move the cursor down to **2:normalcdf(**. Press **ENTER** to select **2:normalcdf(** from the DISTR menu and paste it onto the Home screen. At this point, your screen should look like the screen on the right given above with the cursor blinking by the left parenthesis.

The **normalcdf(** command takes four arguments. These arguments are the values of lower bound, upper bound, μ , and σ . These values must be entered in that order starting from the location of the blinking cursor and each value must be followed by a comma, with the exception of the last value entered. Since what needs to be computed is the proportion of boys with $x>240$, the value of the lower bound is 240. The value of the upper bound is a very large number to the right of 240 such as 10^{99} . The value of μ is 170 and the value of σ is 30. Type in 240 for the lower bound. Press **,**. The upper bound is entered as follows by using the scientific notation. Press **1** followed by **2nd** and **,**. Type in

99. Press **2nd**. Type in 170 for the value of μ . Press **2nd**. Type in 30 for the value of σ . Press **)**. At this point, your screen should look like the screen on the left given below.

```
normalcdf(240,1E
99,170,30)
```

```
normalcdf(240,1E
99,170,30)
.0098153068
```

Press **ENTER** to see the result of the normal distribution computation. Your screen should look like the screen on the right given above.

The interpretation of the above result in the context of the problem can be stated as follows. The proportion of 14-year-old boys who have high blood cholesterol is 0.0098 or approximately 1% of 14-year-old boys have high blood cholesterol.

Example#1.17 p. 60: What percent of 14-year-old boys have blood cholesterol between 170 and 240 mg/dl?

What needs to be computed is the proportion of 14-year-old boys with $170 < x < 240$. The value of the lower bound becomes 170. The value of the upper bound is 240. The values of μ and σ are still 170 and 30, respectively.

Press **2nd** and **VAR** to access the DISTR menu again. Press **↓** to move the cursor down to **2:normalcdf**(. Press **ENTER** to select **2:normalcdf**(from the DISTR menu and paste it onto the Home screen. Enter the values for the lower bound, upper bound, μ , and σ in that order. Press **)**. At this point, your screen should look like the screen on the left given below.

```
normalcdf(240,1E
99,170,30)
.0098153068
normalcdf(170,24
0,170,30)
```

```
normalcdf(240,1E
99,170,30)
.0098153068
normalcdf(170,24
0,170,30)
.4901846926
```

Press **ENTER** to see the result of the normal distribution computation. Your screen should look like the screen on the right given above.

The interpretation of the above result in the context of the problem can be stated as follows. The proportion of 14-year-old boys who have blood cholesterol levels between 170 and 240 mg/dl is 0.49 or approximately 49% of 14-year-old boys have blood cholesterol levels between 170 and 240 mg/dl.