Normal distribution using TI 84 mystatclass.com

1. Given the population mean, μ = 32; and, the population standard deviation, σ = 2.25, find:
   a) Probability of x < 30.
   b) Probability of x > 35.
   c) Probability of x greater than 30 and less than 35; that is $P_{(30 < x < 35)}$
   d) If we choose 56 values of the random variable at random, and the sample mean is = 33, considering that the population standard deviation is 2.25, what is the probability that samples of the same size are less than 33?
   e) What is the x value that is above 99% of all other values of the variable?

Answers:

Press both, 2nd (in blue) & DISTR (VARS key):

It displays:

choose **normalcdf (**

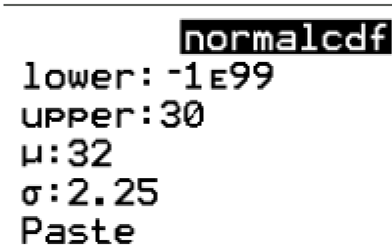
a) Probability of x < 30:

Note: Picture the number line: on the extreme left, negative infinity or -1E99:

lower upper

$-\infty$ $(-E99)$ 0 30 $+\infty$

Then enter the lower, upper, mean and standard deviation values.



In order to enter the lower bound as negative infinite, represented by –EE99 (Press the little negative, then 2nd, then the comma key, and then 99). For negative infinite you may also enter -10000 or -99999.

The answer to a) is 0.1870 rounded to four decimal places:

```
normalcdf(⁻1E99,30,32,2.2▸
                .1870313608
```

b) Probability of x > 35.

Greater than 35 means that 35 is the lower bound; the upper bound is infinity: +E99. As follows:

```
      normalcdf
 lower:35
 upper:E99
 μ:32
 σ:2.25
 Paste
```

The answer to $b)$ 0.0912 rounded to four decimal places:

```
normalcdf(35,E99,32,2.25)
                .0912112819
```

c) Probability of x greater than 30 and less than 35: $P_{30<x<35}$


```
      normalcdf
 lower:30
 upper:35
 μ:32
 σ:2.25
 Paste
```

The answer to $c)$ 0.7218 rounded to four decimal places:

```
normalcdf(30,35,32,2.25)
                .7217573574
```

d) For a random sample of the variable x, of size n = 56, the probability that sample means of the same size are less than 33:

In this case, the Central limit theorem applies; therefore, we <u>divide the standard deviation by the square root of the sample size</u>. This is a question of less than a value, as follows:

```
normalcdf
lower:-E99
upper:33
μ:32
σ:2.25/√(56)
Paste
```

Answer: The probability that samples of size 56 are less than 33, is about 0.9996:

```
normalcdf(-E99,33,32,2.25▸
                .9995593035
```

e) The x value that is above 99% of all other values of the variable: In this case we know the probability or area, 0.99; choose Inverse Normal, **InvNorm**:

```
DISTR DRAW
1:normalpdf(
2:normalcdf(
3:invNorm(
4:tpdf(
5:tcdf(
6:χ²pdf(
7↓χ²cdf(
```

InvNorm enter area, 99% ➔ 0.99

```
invNorm
area:0.99
μ:32
σ:2.25
Paste
```

The answer to e) is the variable x value that is above 99% of the population is x = 37.23, rounding to two decimal places.

```
invNorm(0.99,32,2.25)
                37.23428272
```