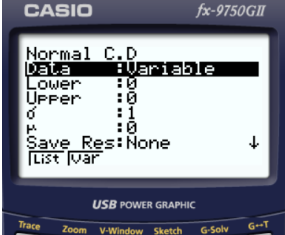


**Normal distribution using Casio 9750GII or Casio 9860GII:**

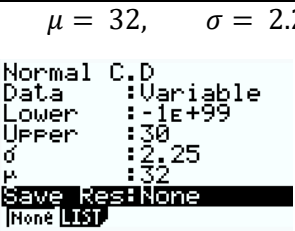
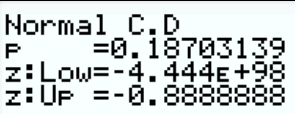
1. Given the population mean,  $\mu = 32$ ; and, the population standard deviation,  $\sigma = 2.25$ , find:
  - a) Probability of  $x < 30$ .
  - b) Probability of  $x > 35$ .
  - c) Probability of  $x$  greater than 30 and less than 35:  $P_{30 < x < 35}$
  - d) If we choose 56 values of the random 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?

How to access the Normal Distribution on the Calculator:

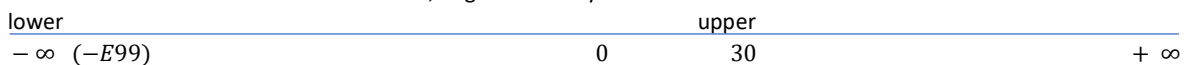
 <p>Press F5, DIST</p>	 <p>Press F1, NORM</p>
 <p>Then choose F2, Ncd</p>	 <p>Ncd look like this: Update Lower, upper, <math>\sigma</math>, <math>\mu</math> and hit EXE.</p>

For the question stated above:

- a) Probability of  $x < 30$ .

<p><math>\mu = 32, \quad \sigma = 2.25</math></p>  <p>Press EXE (results on the right)</p>	 <p><math>P(x &lt; 30) = 0.1870</math> rounded to four decimal places.</p>
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**Note:** Picture the number line: on the extreme left, negative infinity or -1E99:



b) Probability of  $x > 35$ .

	lower	upper
0	35	$+\infty$
		+E99

<pre>Normal C.D Data :Variable Lower :35 Upper :1E+99 σ :2.25 μ :32 Save Res:None  None LIST </pre> <p>Press EXE</p>	<pre>Normal C.D P =0.09121121 z:Low=1.33333333 z:UP =4.4444E+98</pre> <p><math>P(x &gt; 35) = 0.0912</math> rounded to four decimal places.</p>
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c) Probability of  $x$  greater than 30 and less than 35:  $P_{30 < x < 35}$

-E99	0	30	35	+E99
		Lower	Upper	

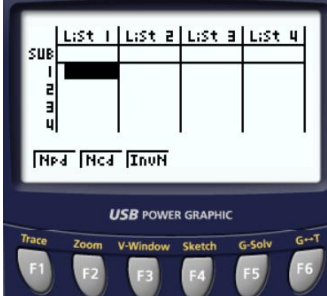
<pre>Normal C.D Data :Variable Lower :30 Upper :35 σ :2.25 μ :32 Save Res:None  None LIST </pre>	<pre>Normal C.D P =0.72175738 z:Low=-0.88888888 z:UP =1.33333333</pre> <p><math>P(30 &lt; x &lt; 35) = 0.7218</math> rounded to four decimal places.</p>
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d) 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?

In this case, we need to divide the standard deviation by the square root of the sample size, 56:

<pre>Normal C.D Data :Variable Lower :-1E+99 Upper :33 σ :2.25÷√(56) μ :32 Save Res:None</pre>	<pre>Normal C.D P =0.99955936 z:Low=-3.326E+99 z:UP =3.32591768</pre> <p>The probability that samples of size 56 are less than 33, is about 0.9996.</p>
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e) What is the  $x$  value that is above 99% of all other values of the variable? Use Inverse Normal:

 <p>Choose F3 for InvN</p>	<pre>Inverse Normal Data :Variable Tail :Left Area :0.99 σ :2.25 μ :32 Save Res:None  None LIST </pre> <p>Press EXE:</p> <pre>Inverse Normal xInv=37.2342827</pre> <p>The answer to d) is the variable <math>x</math> value that is above 99% of the population is <math>x = 37.23</math>, rounding to two decimal places.</p>
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