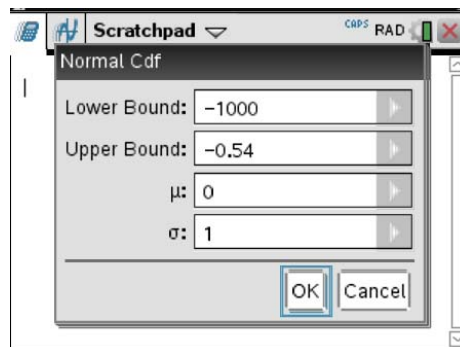


5. Finding Areas from Values in a Normal Distribution

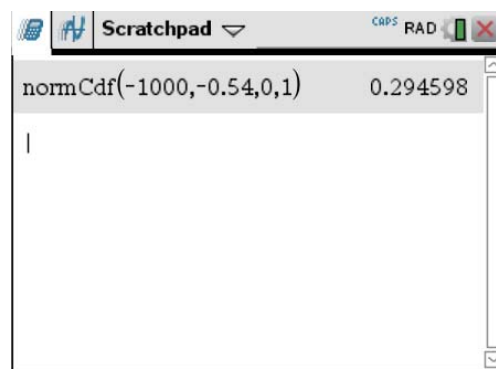
The `normalcdf` command can be used to find areas under a Normal curve. The syntax is `normalcdf (lower bound, upper bound, mean, standard deviation)`. Let's use this command to calculate the proportion of ITBS vocabulary scores in Gary, Indiana that are less than 6. Note that we can do the area calculation using the standard Normal distribution or the Normal distribution with mean 6.84 and standard deviation 1.55.

Using the standard Normal distribution: What proportion of observations from the standard Normal distribution are less than $z = -0.54$? Recall that the standard Normal distribution has mean 0 and standard deviation 1.

On the Home screen, select the *Calculate* scratchpad. Next press **(menu)** → *Statistics* → *Distributions* → *Normal Cdf*. A dialogue box will appear. Type the numbers in the dialogue box shown. To move between the drop-down boxes, press **(tab)** after typing each number. When the last number is entered, **(tab)** to **OK** and press **(enter)**.



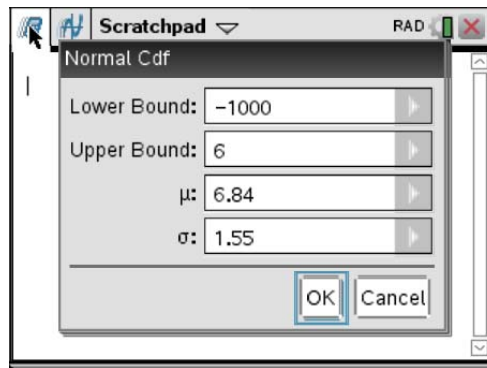
The proportion should now be displayed on the main screen. *Note:* We chose -1000 as the lower bound, because it is many standard deviations below the mean.



This result matches what we got using table A.

Using the unstandardized Normal distribution: What proportion of observations in a Normal distribution with mean $\mu = 6.84$ and standard deviation $\sigma = 1.55$ are less than $x = 6$?

On the Home screen, select the *Calculate* scratchpad. Next press **(menu)** → *Statistics* → *Distributions* → *Normal Cdf*. A dialogue box will appear. Type the numbers in the dialogue box shown. To move between the drop-down boxes, press **(tab)** after typing each number. When the last number is entered, **(tab)** to **OK** and press **(enter)**.



The proportion should now be displayed on the main screen.

