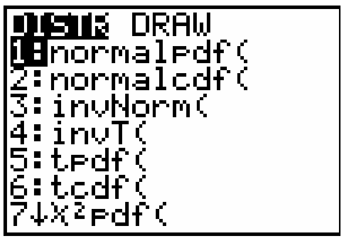
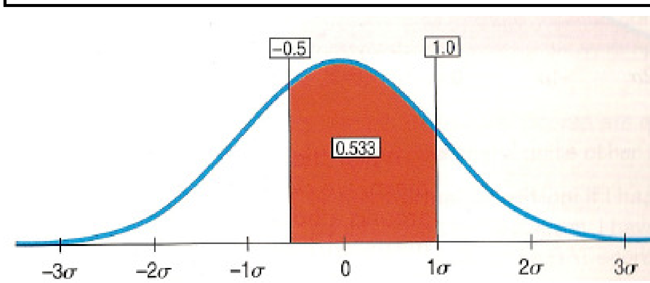
The Normal Model

Your calculator knows the Normal model. Take a look under **2ND DIST**. There you will see three "norm" functions: **normalpdf(**, **normalcdf**, and **invNorm(**.

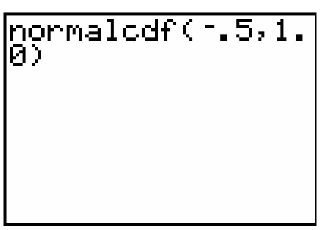


- **normalpdf(** is one you won't use very often – if at all. There's no need to play around with this one.
- **invNorm(** will be used in just a minute. Hold off on it for now.
- **normalcdf(** is the one we want. It finds the area under the Normal curve between two cut points. By specifying **normalcdf(zLeft , zRight)**, you will ask the calculator to find the area in question.
  ***DO** make friends with this function!* ☺

When You Know the Two Cut Points

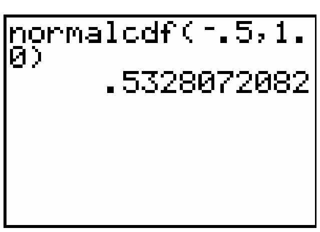


This example shows a Normal model with cut points of z = -0.5 and z = 1.0. We'd like the calculator to tells us the area under the curve. (We know it's 0.533, just so we can check that we're doing it correctly.)



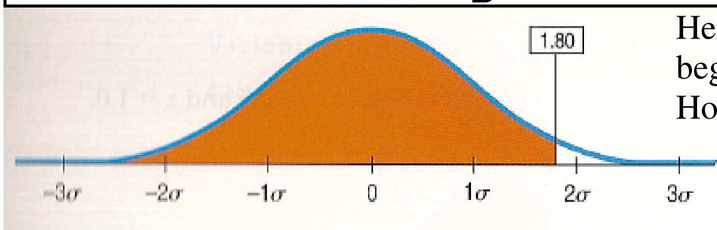
Select **2:normalcdf(**, hit **ENTER**.

Specify the cut points as **normalcdf(-.5 , 1.0)**, and hit **ENTER** again.



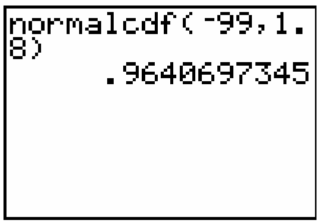
There it is…0.533. Approximately 53% of the Normal model lies between half a standard deviation below and one standard deviation above the mean.

When You Know Only One Cut Point



Here we see that the shaded area under the curve begins at negative infinity and cuts off at 1.80. How do you tell the calculator that one of your cut points involves infinity?

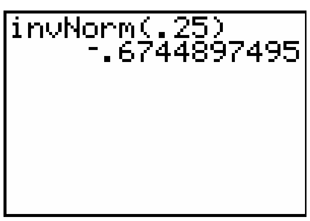
Recall that for a Normal model almost all of the area is contained within three standard deviations below the mean through three standard deviations above the mean. So **any** cut point that is further than 3 will do. Using 5 is fine. So is 36. The text suggests 99 (and -99, when the cut point is negative infinity) because these values are easy to remember and *way* beyond any meaningful location.



Use the command **normalcdf(-99 , 1.8)**. There you are! The Normal model estimates that approximately 96.4% of the area under the curve is accounted for.

Working Backwards

If you *know* the area that's shaded under the Normal curve and you want to find the z-score (the cut point) that's associated with it, use the **invNormal(** command.

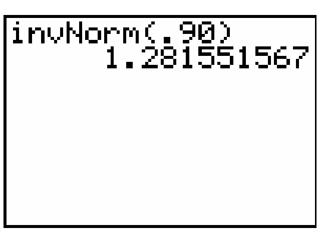


In terms of standard deviations, where does the 25th percentile fall?

Enter **invNormal(.25)** and press **ENTER**. The 25th percentile has an approximate z-score of -0.674.

What z-score cuts off the highest 10% of a Normal model?

Remember how to specify the percentile, and the question is easily solved. Cutting off the top 10% of the curve means that you're looking for the z-score located at the 90th percentile mark.



Enter **invNormal(.90)** and press **ENTER**.

The z-score in question is about 1.28 standard deviations above the mean.