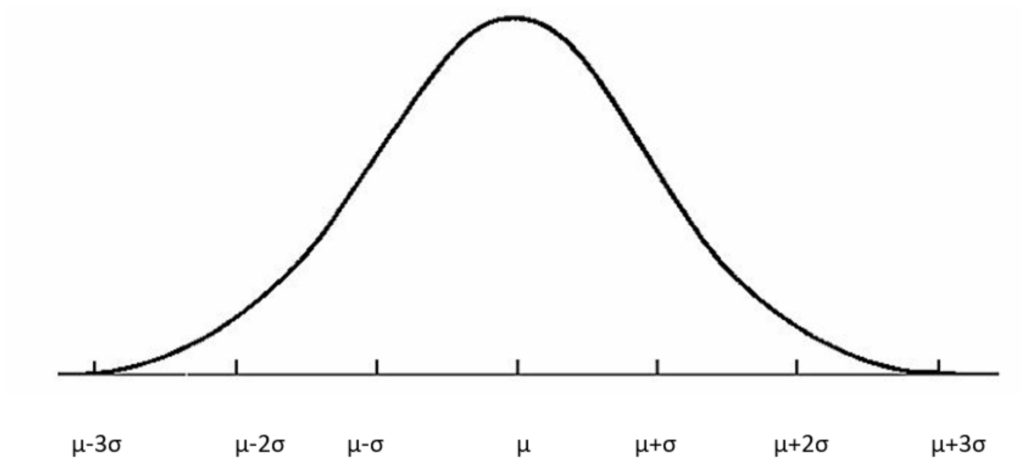
Statistics – TI84 Calculator

NORMAL DISTRIBUTION



Normalcdf: (2nd VARS (distr)) For a population that can be modelled by a Normal model centered at mean μ with standard deviation σ, *N(*μ, σ*):*

This function finds the percentage of the population (or probability) that

1) falls below a given value *A*: *normalcdf (-1EE99, A,* μ, σ*)*
2) falls between two given values *A and B: normalcdf (A, B,* μ, σ*)*
3) lies above a given value *B*: *normalcdf (B, 1EE99,* μ, σ*)*

{We use 1EE99 to represent +∞ and -1EE99 to represent -∞. EE is "2nd ," }

Example: Assuming a normal population has a mean of 24.8 and std dev of 6.2, *N(24.8, 6.2),* what percentage of the population is less than 30.5?

normalcdf(-1EE99, 30.5, 24.8, 6.2)=.8210 or 82.1% of the population is less than 30.5

invNorm (2nd VARS (distr)) For a population that can be modelled by a Normal model centered at mean μ with standard deviation σ, *N(*μ, σ*):*

This function finds the nth percentile. That is, the value that has n% of the population below it.

nth percentile value = invNorm(n, μ, σ*)*

Example: Assuming a normal population has a mean of 24.8 and std dev of 6.2, *N(24.8, 6.2),* what is the 40th percentile (40% of the population is below what value?)?

invNorm(.4, 24.8, 6.2)=23.229 or 40% of the population is below 23.229

z-score is a standardized value. It represents how many standard deviations above (or below) a data value is from the mean. Z-scores have a mean of 0 and a standard deviation of 1.

$$z = \frac{y - \mu}{\sigma}$$

Normalcdf and invNorm can be used with z-scores

To find the percentage of the population that falls:

1) below a given value: Find the z-score for the value. Then calculate *normalcdf (-1ee99, z, 0, 1)*
2) falls between 2 values: Find the z-score for each value. Then calculate $(z_1, z_2, 0, 1)$
3) lies above a given value: Find the z-score for the value. Then calculate *normalcdf (z, 1ee99, 0, 1)*

{The calculator default is mean 0 and std dev 1}

Example: Assuming a normal population has a mean of 24.8 and std dev of 6.2, *N(24.8, 6.2)*, what percentage of the population is less than 30.5?

$$z = \frac{30.5 - 24.8}{6.2} = .919355$$

normalcdf(-1ee99,.919355) = .8210 or 82.1% of the population is less than 30.5

{keep many decimals in z-score calculation or the normalcdf calculation will be “off”}

To find the nth percentile z-score:

First find the nth percentile z-score = *invNorm(n,0,1)*
Next use z-score formula to solve for the nth percentile value

Example: Assuming a normal population has a mean of 24.8 and std dev of 6.2, *N(24.8, 6.2)*, what is the 40th percentile (40% of the population is below what data value?)?

invNorm(.4, 0,1) = -.253347 = *40th percentile z-score*

$$z = -.253347 = \frac{y - 24.8}{6.2}$$

solve for y

y = 23.229   40% of the population is below 23.229

{keep many decimals in invNorm output or the y calculation will be “off”}