

STA 1013 : Statistics through Examples

Lecture 13: Calculator (normalcdf, invNorm)

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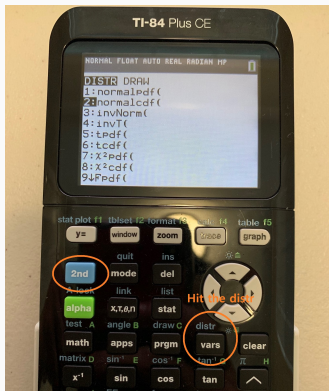
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normalcdf

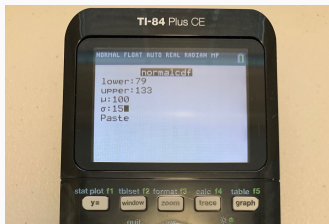
normalcdf

Used for calculating probability from the given number



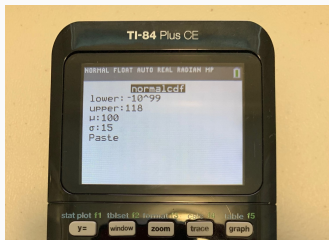
Click the **distr** → **2:normalcdf(**

normalcdf (interval)



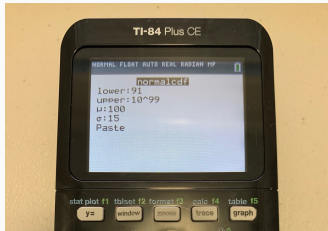
normalcdf(left, right, μ , σ)

normalcdf (left tail)



- $\text{normalcdf}(-\infty, \text{right}, \mu, \sigma)$
- $-\infty = -1E99, -10^{99}, -99999$

normalcdf (right tail)



- $\text{normalcdf}(\text{left}, \infty, \mu, \sigma)$
- $\infty = +1E99, 10^{99}, 99999$

normalcdf (Example)

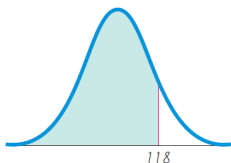
X follows normal distribution $N(\mu = 89, \sigma = 5)$. Find the probability.

- $P(X \leq 80)$
- $P(X \geq 93)$
- $P(71 \leq X \leq 99)$

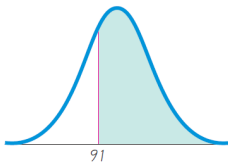
normalcdf (Example)

The graphs depict IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15

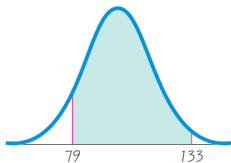
5.



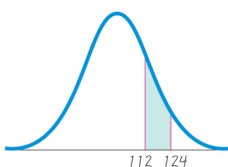
6.



7.



8.



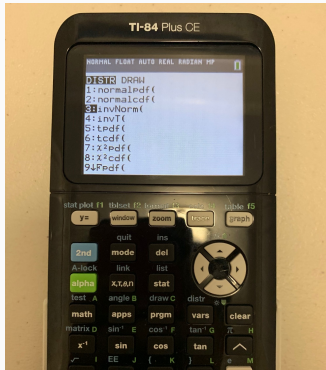
normalcdf (Example)

Example

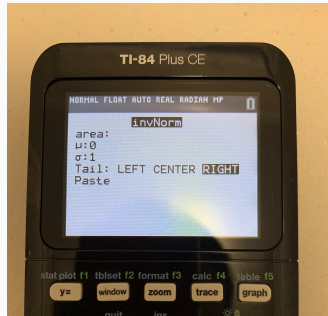
Replacement times for CD players are normally distributed with a mean of 7.1 years and a standard deviation of 1.4 years (data from Consumer Reports). What is the probability that a randomly-selected CD player will have to be replaced in 8 years or less?

invNorm

Find the value from the given probability



Click the **distr** → **3:invNorm(**



- area : Enter the probability
- Tail : Select the types of probability

Do you have the Tail option in your calculator ?

invNorm (Example)

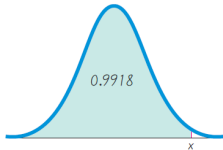
X follows normal distribution $N(\mu = 89, \sigma = 5)$. Find the value x .

- $P(X \leq x) = 0.25$
- $P(X \geq x) = 0.75$
- $P(X \leq x) = 0.5$
- $P(X \geq x) = 0.3$

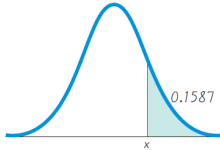
invNorm (Example)

The graphs depict IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15

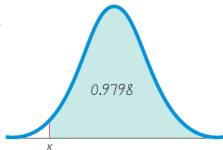
9.



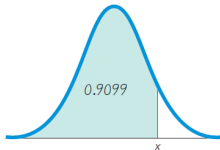
10.



11.



12.



Exercise

Navy pilots

Men's heights are normally distributed with mean 69.5 in. and standard deviation 2.4 in. Women's heights are normally distributed with mean 63.8 in. and standard deviation 2.6 in. The U.S. Navy requires that fighter pilots have heights between 62 in. and 78 in.

- Find the percentage of women meeting the height requirement. Are many women not qualified because they are too short or too tall?
- Find the percentage of men meeting the height requirement. Are many men not qualified because they are too short or too tall?

Exercise

- c. If the Navy changes the height requirements so that all women are eligible except the shortest 2% and the tallest 2%, what are the new height requirements for women?

- d. If the Navy changes the height requirements so that all men are eligible except the shortest 1% and the tallest 1%, what are the new height requirements for men?