

## Normal Distribution

### TI Calculator Steps: Calculate probability with normal distribution

1. Press **2<sup>nd</sup>** then, **VARΣ** keys to access the DISTR (distributions) menu.
2. Select **normalcdf** and click **ENTER**.
3. Enter the **Lower bound**, **upper bound**, **mean** , and **standard deviation** .  
If you have TI 83, then you will have **normalcdf(lower bound, upper bound, mean, standard deviation)**.  
Note: Use -1E99 for negative infinity, and use E99 for positive infinity.

### TI Calculator Steps: Find X value from the given probability (percent).

1. Press **2<sup>nd</sup>** then, **VARΣ** keys to access the DISTR (distributions) menu.
2. Select **invNorm** and click **ENTER**.
3. Enter the **area on the left** , **mean**, **standard deviation** .

Example: The IQ scores for college students are normally distributed with mean of 105 and a standard deviation of 13.

- a. A student is randomly selected, find the probability that the student has IQ score less than 112.  
X: IQ score  
 $P(X < 112) = \text{normalcdf}(-E99, 112, 105, 13) = 0.7049$
- b. A student is randomly selected, find the probability that the student has IQ score between 95 and 110.  
X: IQ score  
 $P(95 < X < 110) = \text{normalcdf}(95, 110, 105, 13) = 0.4289$
- c. Find the 25<sup>th</sup> percentile ( $P_{25}$ )  
 $X = \text{invNorm}(0.25, 105, 13) = 96.23$

### **Practice Problems**

1. The scores on a test are normally distributed with a mean of 65 and a standard deviation of 12.
  - a. What is the probability that a randomly selected student has a test score more than 70?
  - b. What is the probability that a randomly selected student has a test score less than 50?
  - c. The instructor requires mandatory tutoring for students with the lowest 10% of test score, what is the cutoff score?

