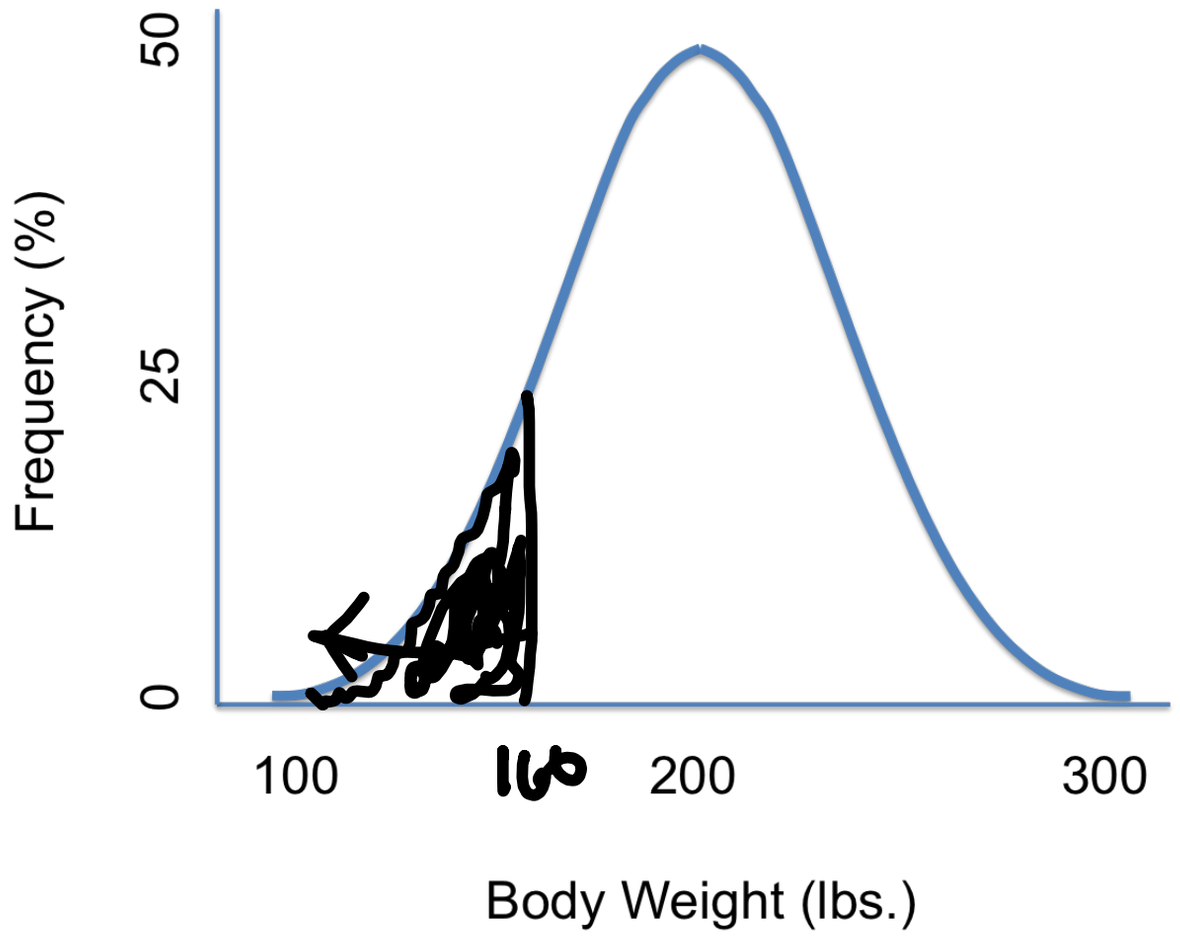
Discrete Random Variables

- Topics: Probability in Normal Density Curves
- Objective: Students will be able to calculate probabilities using desity curves.
- Standards: AP Stats: VAR-6 (EU), VAR-6.A (LO), VAR-6.A.2 (EK), VAR-6.A.3 (EK), VAR-6.B (LO), VAR-6.B.1 (EK), VAR-6.B.2 (EK)

Probability in a Density Curve

Definition: A ***normal density curve*** is a graph that shows probability. The area under the density curve is equal to 100 percent of all probabilities.

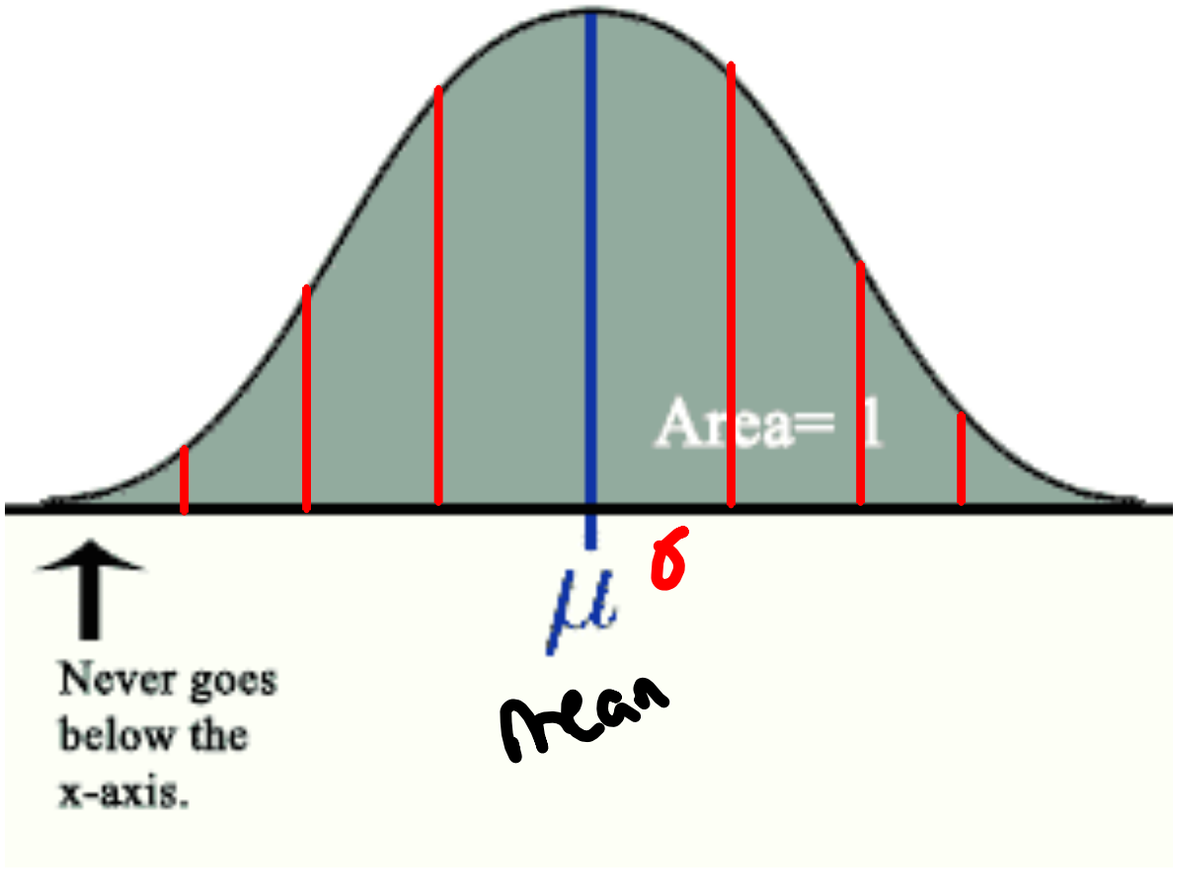
You will need the TI-84 to complete these exercises.



Probability in a Density Curve

You will need the z-score table and the TI-84 to complete these exercises.

Let's talk about the curve.



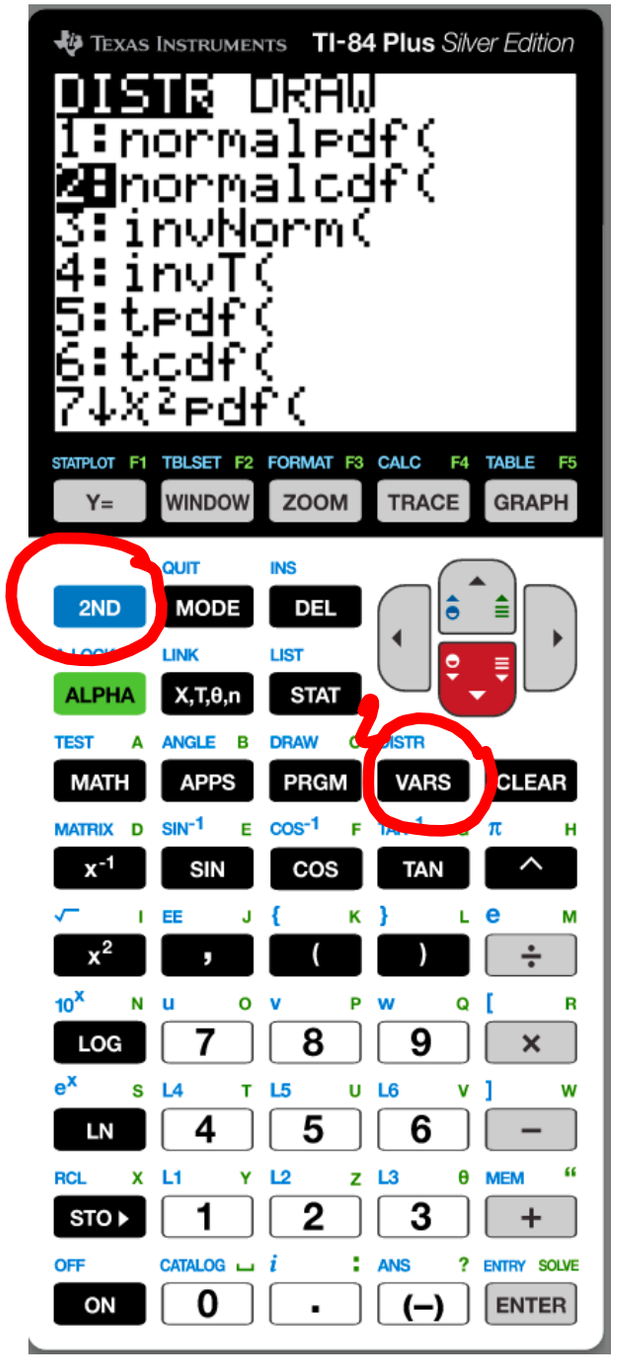
Probability in a Density Curve

Difference between ***normalpdf*** and ***normalcdf:***

The calculator function ***"normalpdf"*** stands for normal probability density function. It finds the height of a normal curve at any given point.

The ***"normalcdf"*** function stands for normal cumulative density function, and it finds the area below a normal curve between two given points.

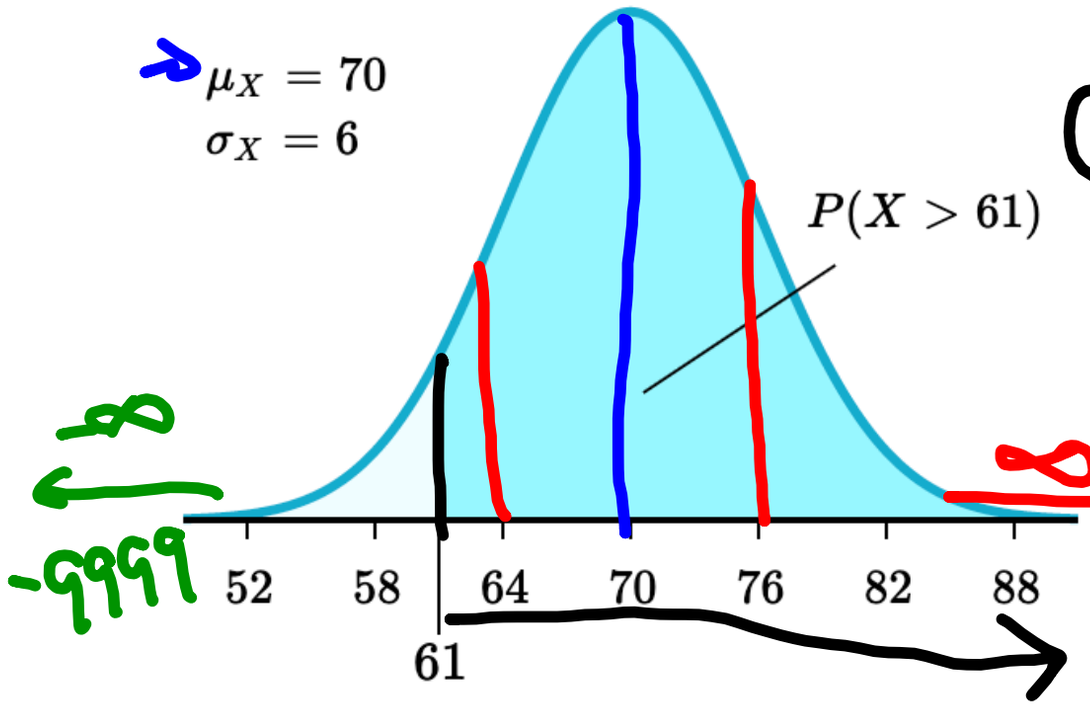
Since probability for a continuous random variable relates to shaded area under its density curve, we always use ***"normalcdf"*** to find probability when we're dealing with a normally distributed variable.



Probability in a Density Curve

Example 1: A set of biology exam scores are normally distributed with a mean of 70 points and a standard deviation of 6 points. Let X represent the score on a randomly selected exam from this set.

Find P(X>61)
You may round your answer to two decimal places.



① lower bound = 61

② upper bound = 9999

③ $\mu_x = 70$ mean

④ $\sigma = 6$ S.D.

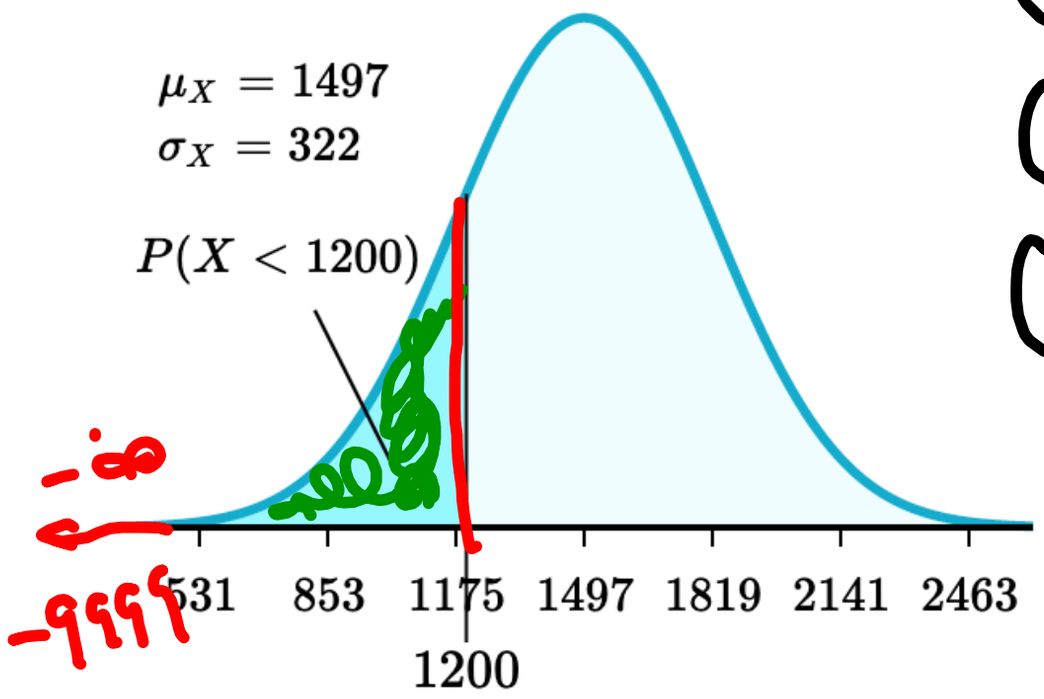
$P(x>61) = .933 \sim 93$

93%

Probability in a Density Curve

Example 2: The distribution of SAT scores of all college-bound seniors taking the SAT in 2014 was approximately normal with a mean of 1497 and standard deviation of 322. Let X, equals the score of a randomly selected tester from this group.

Find P(X<1200)
You may round your answer to two decimal places.



① lower bound: -9999

② upper bound: 1200

③ mean μ: 1497

④ S.D.σ: 322

P(x<1200) = .178 ~ .18

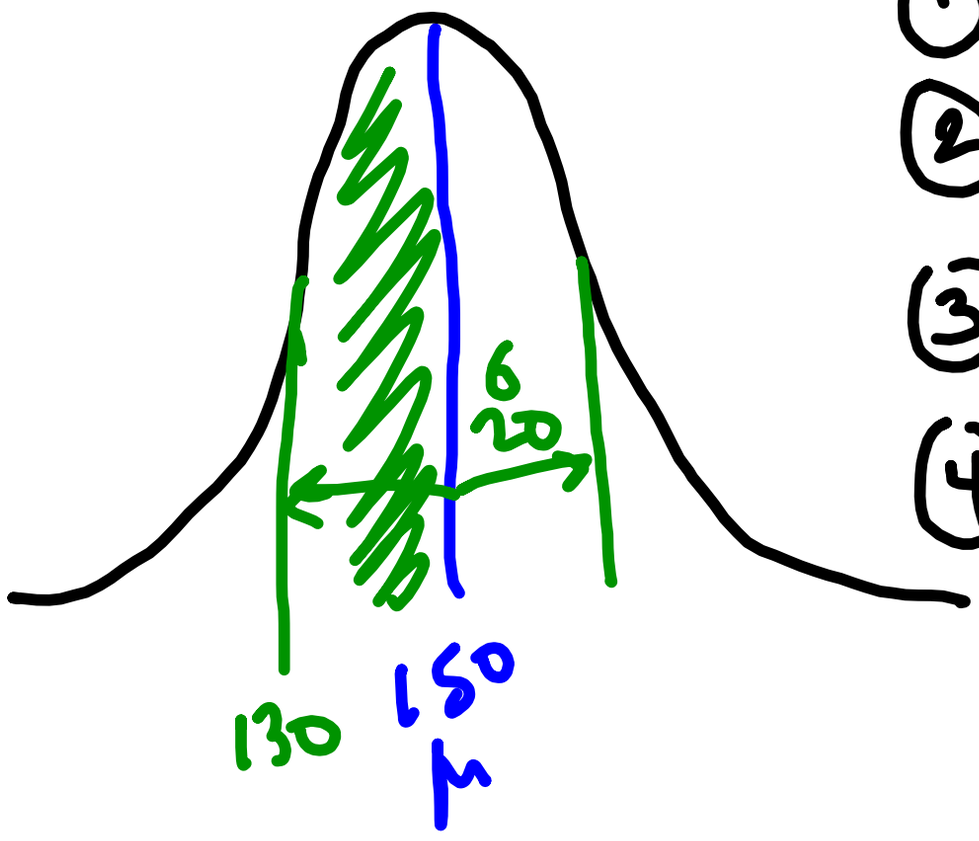
18%

Probability in a Density Curve

Example 3: A set of middle school student heights are normally distributed with a mean of 150 centimeters and a standard deviation of 20 centimeters. Let X, equal the height of a randomly selected student from this set.

Find P(130<X<150)

You may round your answer to two decimal places.



① lower bound: 130

② upper bound: 150

③ μ = 150

④ σ = 20

.341 ~ .34

34%

Displaying and Comparing Quantitative Data

You should be working on the following skills:

1. Probability in density curves
2. Probability in normal density curves