

Example 1

Consider the random variable X , a person's height, drawn from a population where the X is distributed normally with mean of 66 and variance of 20.

What is $P(X > 66.5)$?

Suppose we randomly select 125 individuals from that population. What is the probability that the mean height is at least 66.5 inches? Does it matter whether X is distributed normally?

Example 2

For a class project, a student wants to check whether final exam stress raises blood pressure of the students in her class. When they are not under any stress, college students have an average systolic blood pressure of 120mm Hg. For the 50 students in her class, the average blood pressure on the day of the final exam is 125.2 mm Hg with a standard deviation of 12mm Hg.

What is the p-value of her test?

What should the student conclude about whether final exam stress is associated with higher blood pressure?

Example 3

Another student wants to check whether final exams raise students' blood pressure more for chemistry or economics classes. For the 50 students in her economics class, the average blood pressure on the day of the final exam is 125.2 mm Hg with a standard deviation of 12mm Hg. For the 100 students in her chemistry class, the average blood pressure is 120 mm Hg with a standard deviation of 24mm Hg.

Conduct the hypothesis test at the 10% level for whether final exams raise students' blood pressure more for chemistry or economics students. Set up a null and alternative hypothesis, report your t-statistic, and your conclusion. Use a standard normal distribution table.

[Side note] Does this mean that economics exams are more stressful than chemistry? Why or why not?