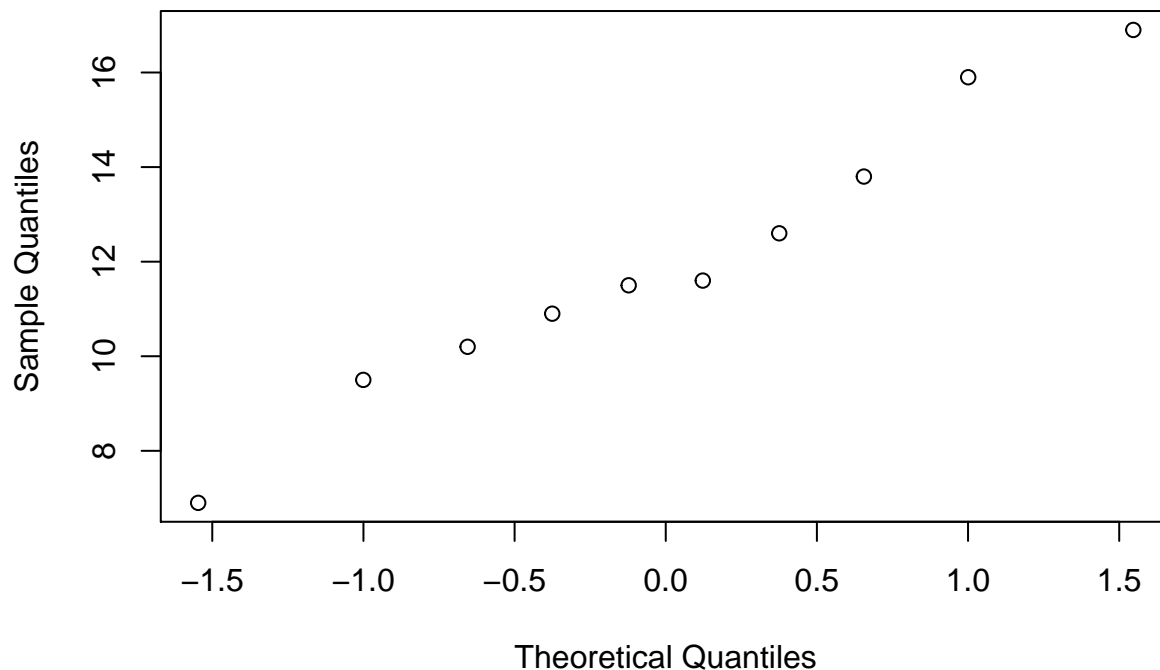


Homework 4-Due: Tuesday 10/24, 5pm

1. Marcello the monkey is doing some calculations with his banana hoard. He has 200 bananas, which have a *total* weight of 25 kilograms. Assume the weight of a banana can be represented as a random variable with mean μ and standard deviation σ . Marcello remembers from his freshman course in bananology that σ is equal to 10 grams.
 - a. Construct a 95% confidence interval for μ , the average weight of an individual banana.
 - b. Being a precision oriented monkey, Marcello would like to know μ to within a margin of 0.1 grams with 99% certainty. How many bananas would he need in order to accomplish this?
 - c. Marcello's banana pudding calls for three bananas and an amount of custard whose weight is exactly equal to that of the bananas. What is the standard deviation of the weight of a recipe of banana pudding?
2. A researcher is studying the size of leafcutter ant colonies in a certain region. She measures the radius, in meters, of ten different mounds. Here are her measurements:
10.9, 15.9, 11.6, 9.5, 13.8, 11.5, 12.6, 16.9, 6.9, 10.2
 - a. Calculate the sample mean for these values.
 - b. Calculate the sample standard deviation for these values.
 - c. Construct a 95% confidence interval for leafcutter mound radius.
 - d. The following is a qqplot of the data. Do you think the assumptions we used to build our confidence interval are appropriate?

Normal Q-Q Plot



3. Suppose that, in a sample of 600 individuals, 48 have allergic reactions to pollen. Construct a 90% confidence interval for the proportion of individuals from the population who have an allergic reaction to pollen.