

Statistics 101 – Laboratory 3

This week’s lab looks at the normal model as a way of describing the distribution of a population. You should work in groups of 4 or 5 and your group should hand in one answer sheet.

1. The weights of young adult males and females have increased over the past 40 years but so have heights. The body mass index ($BMI = \frac{Weight(kg)}{(Height(m))^2}$) combines information about an individual’s height and weight and can be used to classify individuals into a Weight Status category.

BMI	Weight Status
BMI less than 18.5	Underweight
$18.5 \leq BMI < 25.0$	Normal weight
$25.0 \leq BMI < 30.0$	Overweight
BMI 30.0 and above	Obese

Below is information on BMI for young males age 20 to 29 and young females age 20 to 29 in the early 1960’s and the early 2000’s.

BMI	Early 1960’s		Early 2000’s	
	males	females	males	females
mean, μ	24.3	22.2	26.6	26.8
std. dev., σ	5.4	5.8	6.0	7.0

The distribution of BMI values can be described using a normal model.

- a) Use the 68-95-99.7 rule to find the percentage of young males in the early 1960’s with BMI greater than 35.1.
- b) Use the 68-95-99.7 rule to find the percentage of young females in the early 1960’s with BMI less than 16.4.
- c) Use the 68-95-99.7 rule to find the BMI values that correspond to the central 68% of the distribution of young males in the early 2000’s?
- d) Use the 68-95-99.7 rule to find the BMI values that correspond to the central 95% of young females in the early 2000’s.

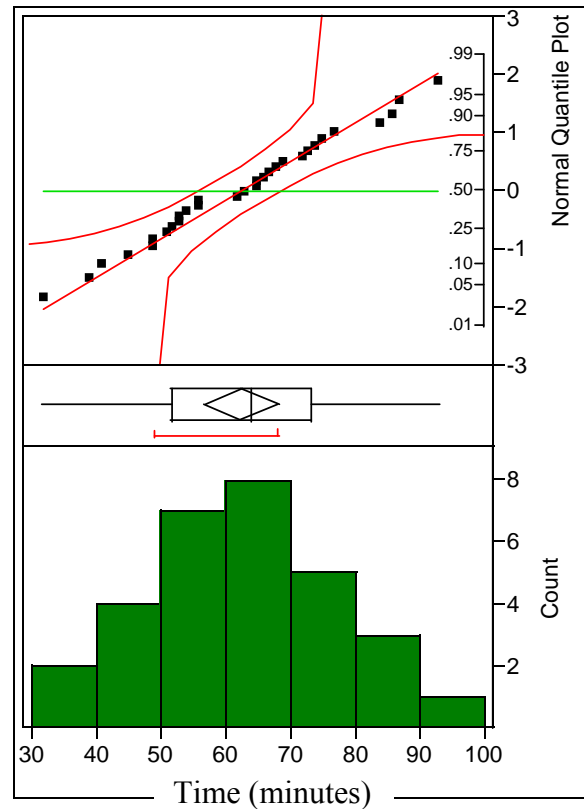
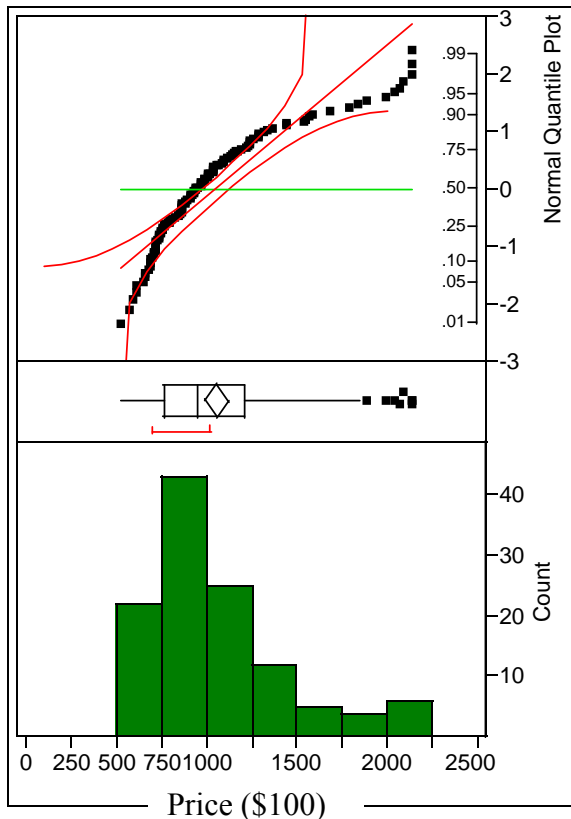
Use Table Z in the text to find the following percentages.

- e) The percentage of young females in the early 1960’s who would be classified as Underweight (BMI less than 18.5).
- f) The percentage of young females in the early 2000’s who would be classified as Underweight (BMI less than 18.5).
- g) Comment on the change from the early 1960’s to the early 2000’s in the percentages of young females classified as Underweight.
- h) The percentage of young males in the early 1960’s who would be classified as Obese (BMI greater than or equal to 30).
- i) The percentage of young males in the early 2000’s who would be classified as Obese (BMI greater than or equal to 30).

- j) Comment on the change from the early 1960's to the early 2000's in the percentages of young males classified as Obese.
- k) Use Table Z in the text to find the cutoff value for young males and for young females in the early 2000's such that 4% of the population has BMI greater than the cutoff.
2. When working with sample data, one often asks, "Could this sample have come from a population whose distribution follows a normal model?" For each of the samples below, look at the distribution of the sample, describe in words what you see in each of the plots (histogram, box plot and normal quantile plot), and comment on whether the sample could have come from a population whose distribution follows a normal model.

a) Prices (\$100) for 117 randomly selected homes.

b) Time (minutes) spent at fitness center for 30 randomly selected students.



Stat 101 Lab 3
Group Answer Sheet

Group Members:

1. Body Mass Index and the normal model.
 - a) Use the 68-95-99.7 rule to find the percentage of young males in the early 1960's with BMI greater than 35.1.

 - b) Use the 68-95-99.7 rule to find the percentage of young females in the early 1960's with BMI less than 16.4.

 - c) Use the 68-95-99.7 rule to find the BMI values that correspond to the central 68% of the distribution of young males in the early 2000's?

 - d) Use the 68-95-99.7 rule to find the BMI values that correspond to the central 95% of the distribution of young females in the early 2000's?

Use Table Z in the text to find the following percentages.

- e) The percentage of young females in the early 1960's who would be classified as Underweight (BMI less than 18.5).

k) Use Table Z in the text find the cutoff value for young males and for young females in the early 2000's such that 4% of the population has BMI greater than the cutoff.

- Young males in the early 2000's

- Young females in the early 2000's

2. "Could this sample have come from a population whose distribution follows a normal model?"

a) Home prices

- Histogram

- Box plot

- Normal Quantile Plot

- Normal Distribution?

b) Fitness center times

- Histogram

- Box plot

- Normal Quantile Plot

- Normal Distribution?