

Statistics 101L – Homework 3

Due Wednesday, February 4, 2009

Homework is due on the due date at the end of the lecture.

Reading: January 26 – January 30 Chapter 6
 February 2 – February 4 Chapter 7

Assignment:

Weights of adult males and females have increased over the past 40 years but so have heights. The body mass index (BMI) combines information about an individual's height and weight and can be used to classify individuals into a Weight Status category.

BMI	Weight Status
Below 18.5	Underweight
$18.5 \leq \text{BMI} < 25.0$	Normal weight
$25.0 \leq \text{BMI} < 30.0$	Overweight
30.0 and above	Obese

Below is information on BMI for males and females age 18 and 19 in 1980, 1990 and 2000.

BMI	1980		1990		2000	
	males	females	males	females	males	females
mean, μ	22.8	22.4	23.1	23.3	24.5	24.9
std. dev., σ	4.4	4.4	5.2	5.4	5.9	6.0

1. Use the 68-95-99.7 rule to find ...
 - a) the percentage of males in 1980 with BMI less than 14.0.
 - b) the percentage of females in 1980 with BMI greater than 18.0.
 - c) the BMI values that correspond to the central 95% of the distribution of males in 2000?
 - d) the value such that 0.15% of females in 2000 have BMIs greater than the value.
2. Use Table Z in the text to answer the following questions about 18 and 19 year olds.
 - a) What percentage of females in 1980 would be classified as underweight?
 - b) What percentage of females in 1990 would be classified as underweight?
 - c) What percentage of females in 2000 would be classified as underweight?
 - d) Comment on the change from 1980 to 2000 in the percentages of females classified as underweight.
 - e) What percentage of males in 1980 would be classified as obese?
 - f) What percentage of males in 1990 would be classified as obese?
 - g) What percentage of males in 2000 would be classified as obese?
 - h) Comment on the change from 1980 to 2000 in the percentages of males classified as obese.

- i) We wish to identify the cutoff value in 2000 such that 15% of the population has BMI greater than this cutoff. Find the cutoff value for males and the cutoff value for females.
3. Use the JAVA applet found on the web to answer the following questions. Some sites are:
http://davidmlane.com/hyperstat/z_table.html
- a) What percentage of males in 1980 would be classified as overweight?
 - b) What percentage of males in 1990 would be classified as overweight?
 - c) What percentage of males in 2000 would be classified as overweight?
 - d) What percentage of females in 1980 would be classified as normal weight?
 - e) What percentage of females in 1980 would be classified as normal weight?
 - f) What percentage of females in 2000 would be classified as normal weight?
 - g) We want to make a new weight status category that identifies the 2% of females in 2000 with the highest BMIs. What BMIs should be included in this new category?
 - h) Repeat part g) but this time for males.
4. Stat 101 students in the past answered questions on a Stat 101 Survey at the beginning of the semester. The anonymous responses are in the JMP data table StatSurvey.JMP on the course web page.
- a) Go to the Stat 101 course web page and open the **StatSurvey** file.
 - b) Go to the **Tables** pull-down menu and select **Subset**. Click on the circle next to **Random Sample** and enter **50** in the box for **Sampling Ratio or Sample Size**. Click on **OK**. This will create a new JMP data table consisting of a random selection of 50 cases from the StatSurvey. Use this new JMP data table for parts c) and d).
 - c) Use **Analyze – Distribution** to create a Histogram, Box plot and Normal Quantile Plot for the variable **height** (the height of students in inches). What kind of variable is height? Describe each of the plots and use your descriptions to comment on whether the random sample of heights could have come from a population with a distribution that follows a normal model. Turn in the JMP output with your assignment.
 - d) Use **Analyze – Distribution** to create a Histogram, Box plot and Normal Quantile Plot for the variable **musiccds** (the number of music cds owned by the student). What kind of variable is musiccds? Describe each of the plots and use your descriptions to comment on whether the random sample of heights could have come from a population with a distribution that follows a normal model. Turn in the JMP output with your assignment.