STA 580 — Spring 2009 — Dr. Charnigo

Written Assignment 1

This assignment is due on Thursday 05 February at 5:20 p.m. You may work in groups of two or three, submitting one copy of the assignment for the group.

[50] 1. Refer to {Sheet1} of {FEVModified.xls}, which contains forced expiratory volume measurements (column FEV) for 23 smoking adolescents (1 in column Smoke) and 26 non-smoking adolescents (0 in column Smoke).

[10] a. Report the sample mean and sample standard deviation for forced expiratory volume among the smoking adolescents. Do the same for the non-smoking adolescents.

[10] b. Report the sample median and sample interquartile range for forced expiratory volume among the smoking adolescents. Do the same for the non-smoking adolescents.

[10] c. Create side-by-side box plots comparing the sample distribution of forced expiratory volume measurements among the smoking adolescents to the sample distribution of forced expiratory volume measurements among the non-smoking adolescents. Comment on the shape of each distribution. Are the two distributions visually similar with respect to central tendency and variability?

[10] d. Suppose that forced expiratory volume measurements are normally distributed in the population of smoking adolescents. Suppose also that the population mean and population standard deviation happen to be the same as the sample mean and sample standard deviation computed for item a. Under these two suppositions, what is the population percentage of smoking adolescents who have forced expiratory volume measurements between 3.500 and 4.000? Above 4.000?

[10] e. Under the two suppositions introduced in part d, find the forced expiratory volume measurement defining the boundary between the top 20% and bottom 80% in the population of smoking adolescents. What about the boundary between the top 10% and bottom 90%?

[50] 2. Suppose that 20% of men aged 50-59 have diastolic blood pressure greater than 100, 80% of men aged 50-59 with diastolic blood pressure greater than 100 will be alive in ten years, and 90% of men aged 50-59 with diastolic blood pressure less than 100 will be alive in ten years.

[10] a. What percentage of men aged 50-59 will be alive in ten years? What percentage of men aged 50-59 will not be alive in ten years?

[10] b. What percentage of men aged 50-59 satisfy both of the following conditions: (i) diastolic blood pressure less than 100; and, (ii) will be alive in ten years? What percentage of men aged 50-59 satisfy both of the following conditions: (iii) diastolic blood pressure less than 100; and, (iv) will not be alive in ten years?

[10] c. Among men aged 50-59 who will be alive in ten years, what percentage have diastolic blood pressure greater than 100? Among men aged 50-59 who will not be alive in ten years, what percentage have diastolic blood pressure greater than 100?

[10] d. What is the probability that, among 8 randomly selected men aged 50-59, there are at least 2 with diastolic blood pressure greater than 100? What is the approximate probability that, among 80 randomly selected men aged 50-59, there are at least 20 with diastolic blood pressure greater than 100?

[10] e. Suppose that, in a certain community, there live 1000 men aged 50-59. If I told you that 300 of these men had diastolic blood pressure greater than 100, would that surprise you? Why or why not?