MATH 4044 – Statistics for Data Science

Practical Week 6

Question 1

Is there a statistically significant difference between pulse rates for males and females? The data for this question is stored in a SAS data file called `pulse_rates.sas7bdat` located in `mydata` library on the SAS OnDemand server. Variables in that file are as follows:

Variable	Units
Height	cm
Weight	kg
Age	years
Gender	1 = 'Male', 2 = 'Female'
Smokes	1 = 'Yes', 2 = 'No'
Drinks alcohol	1 = 'Yes', 2 = 'No'
Exercise Frequency	1 = 'High', 2 = 'Moderate', 3 = 'Low'
Pulse	Pulse rate, beats per minute

Check the assumptions and perform an appropriate hypothesis test. Interpret the results.

Question 2

A random sample of 10 female university students was asked for their own height and their mother's height. The researchers wanted to know whether female university students are taller on average than their mothers. The results (in cm) were as follows:

Pair	1	2	3	4	5	6	7	8	9	10
Daughter	168	163	163	175	168	165	166	174	175	170
Mother	167	157	165	168	160	167	160	170	179	167

Find and interpret a 95% confidence interval for the parameter of interest in this situation using the *t*-distribution. Are the necessary conditions satisfied to justify using this confidence interval?

Question 3

Each year the US Environmental Protection Agency (EPA) releases fuel economy data on cars manufactured in that year. Below are summary statistics on fuel economy (in miles per gallon) from random samples of cars with manual and automatic transmissions manufactured in 2012. Do these data provide strong evidence of a difference between the average fuel efficiency of cars with manual and automatic transmissions in terms of their average city mileage? Also obtain and interpret an appropriate confidence interval. Assume that conditions for inference are satisfied.

	City MPG	
	Automatic	**Manual**
Mean	16.12	19.85
Standard deviation	3.58	4.51
Sample size	26	26