Işık University
Department of Industrial Engineering

INDE 2156– Engineering Statistics
Homework (1)

Sonya Javadi, Volkan Kayaçetin

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Name: _____

Student Number: _____

- This homework contains 5 pages.
- Please answer every question on one piece of paper and take the photos and upload all the answer sheets as one PDF file on Blackboard.
- Only PDF file is acceptable.
- If the answer sheet is not readable or you forgot to upload all the questions or your PDF file can not be opened, the score for those questions will be ZERO!
- Deadline to upload the answer sheet is 10/11/2024 (23:00 pm).
- Good luck!

Question	Points	Score
1	25	
2	25	
3	25	
4	25	
Total:	100	

1. A team of squirrels in Istanbul, working undercover as nutrition researchers, sneakily gathered the weights (in kilograms) of a group of tourists visiting the city. The squirrels, curious about whether humans have consistent sizes are asking for statistical expertise. The weights are given below.

22 18 135 15 90 78 69 98 102
83 55 28 121 13 22 124 112
70 66 74 89 103 24 21 112 21
40 98 87 132 115 21 28 43 37
50 96 118 158 74 78 83 93 95

   (a) (10 points) Calculate the average human weight from the data they gathered.

   (b) (10 points) Construct a relative frequency histogram to help the squirrels visualize the spread of the weights.

   (c) (5 points) Based on your analysis, do you think the tourists' weights show a normal distribution, or do you suspect these tourists had too many treats from the nearby street food vendors?

2. (25 points) A construction company is deciding between two models of industrial air purifiers for their sites. They need a model that consistently achieves a filtration power of at least 10,000 cubic meters per hour. Two brands, **B** and **D** manufacture these air purifiers, and the filtration powers of both models are normally distributed. Brand **B** 's model has a mean filtration power of 14,000 cubic meters per hour with a standard deviation of 2,000 cubic meters, while Brand **D**'s model has a mean filtration power of 13,000 cubic meters per hour with a standard deviation of 1,000 cubic meters. Considering these specifications, which brand's model will, on average, be selected less frequently?

3. A group of travel bloggers in Turkey is trying to discover the best snack prices at airports! On average, a snack bundle costs 540 TL with a bit of a twist—prices vary, with a standard deviation of 50 TL. Two teams of bloggers, one visiting 32 airports and the other 50 airports, set out to compare their findings. What's the probability that the average snack price differs
   (a) (10 points) by more than 20 TL between the two teams' adventures?
   (b) (15 points) an amount between 5 and 10 TL between the two teams' adventures?

4. (25 points) A team of environmental researchers has been studying air quality across Istanbul for the past five years. At 30 different locations, they measured a specific air quality index to observe pollution levels, which varied significantly from place to place. Here are their recorded values:

3.79, 2.99, 2.45, 2.14, 3.36, 2.05, 3.14, 3.54
2.77, 2.91, 3.10, 1.84, 2.52, 3.22, 2.67, 2.52
2.71, 2.75, 3.57, 3.85, 2.89, 2.83, 3.13, 2.44
2.10, 3.71, 2.37, 2.68, 3.51, 3.37.

Can you create a box plot to show the distribution of these air quality index values across Istanbul? Show all steps!