

The Third Statistics Competition for High School Students in Isfahan (Problems)

(Each team may choose 2 of the following problems, and write down the solutions in the corresponding answer sheets.)

Problem 1:

We have the following information about the weights of 25 boxes of almond (in gram), such that boxes have unequal weights:

$$\text{Variance} = 400 \text{ , Median} = 990 \text{ , Mean} = 980$$

We remove 40 grams of almond from each box. Answer the following questions, by reasoning for remaining boxes:

- Find the mean.
- Find the median.
- Find the standard deviation.
- Find the coefficient of variation.

[10 points]

Problem 2:

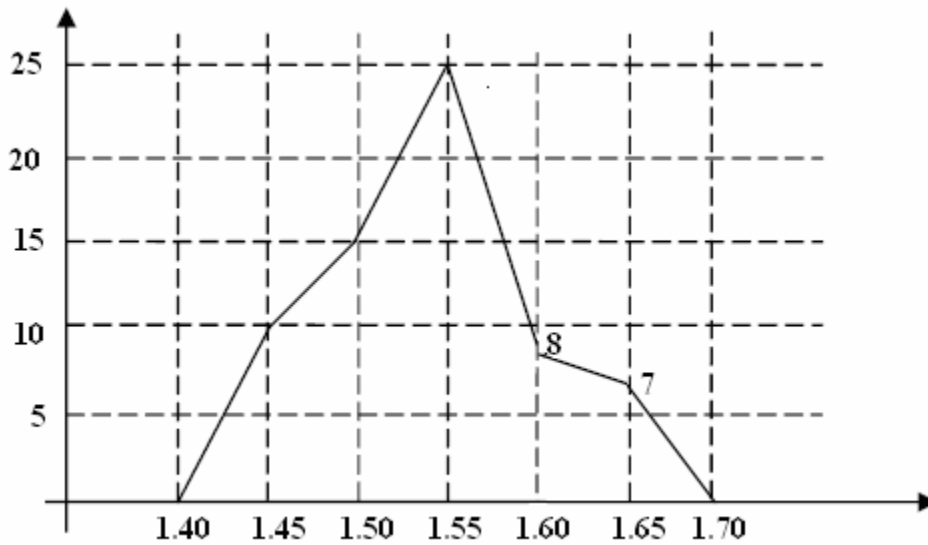
To estimate the number of fishes in a lake, one first fished, then colored and release them in the lake. When the colored fishes were scattered well in the lake, he again hunt some fishes. Afterwards, he estimates the whole number of fishes in the lake by counting the number of colored fishes.

- Find a mathematical formula for calculating the number of fishes, if in the first stage n_1 fishes are colored, and in the second stage n_2 colored fishes and m uncolored fishes are hunted.
- Explain the disadvantages of this method to estimate the number of fishes.

[20 points]

Problem 3:

The diagram of frequency polygon of the data set corresponding to the heights (in meter) of 65 students is follows:

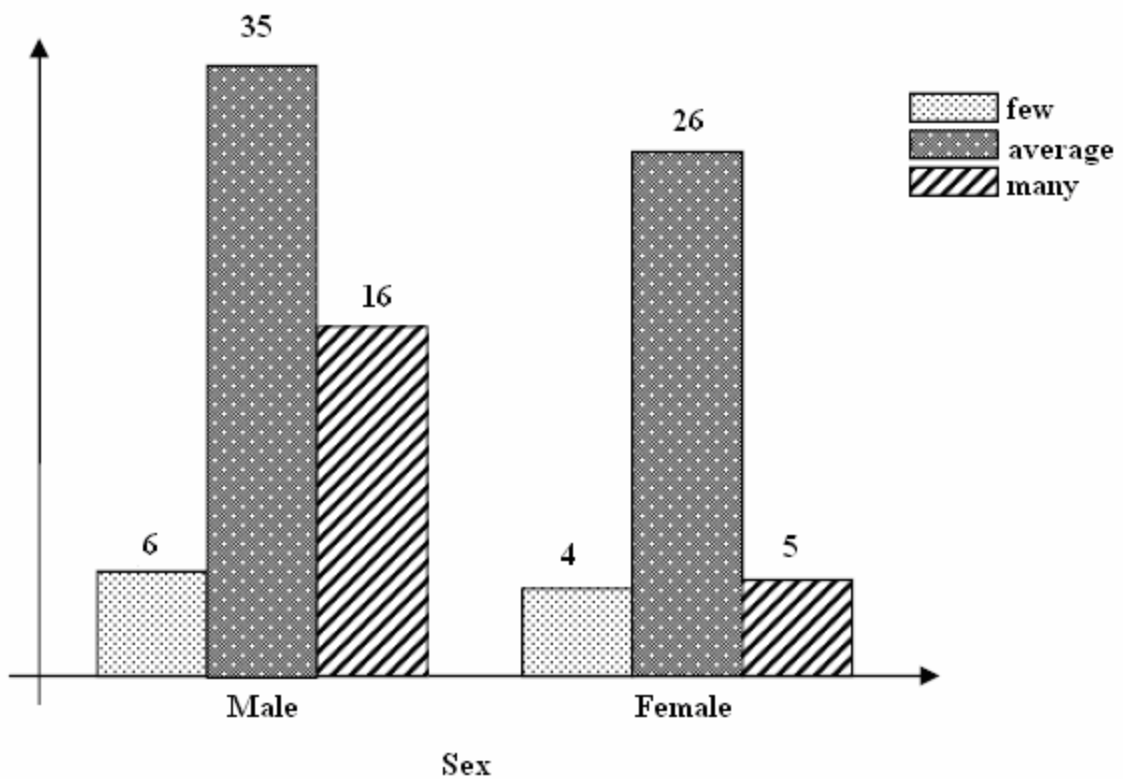


- a) If the unit of the measurement of height changes from meter to centimeter, what changes appear in this diagram? (Explain your reason)
- b) Calculate the coefficient of variation for both cases? According to the results obtained, explain your final answer.

[12 points]

Problem 4:

One researched uses the following diagram to compare the activity between men and women.



What is your opinion about using this diagram?
Do you think this diagram is suitable for comparison? Why?

[8 points]

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