

The Fourth 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:

- If the standard deviation of real data $x_1, x_2, x_3, x_4, 25$ equals zero, then find the mean of real data $x_1, x_2, x_3, x_4, 50$.
- The mean of N real data is N . The mean of a subset with M elements is M . Find the mean of $N-M$ remaining data.

(6 points)

Problem 2:

- Find the number of arrangement for n different object such that none of them set in own place.

(6 points)

Problem 3:

A young couple expect to have three children in the future.

- What is the probability that all of their children are born in the same season?
- What is the probability that two of their children are born in the same season and the other one is born in another season?
- What is the probability that all of their three children are born in three different seasons?

(8 points)

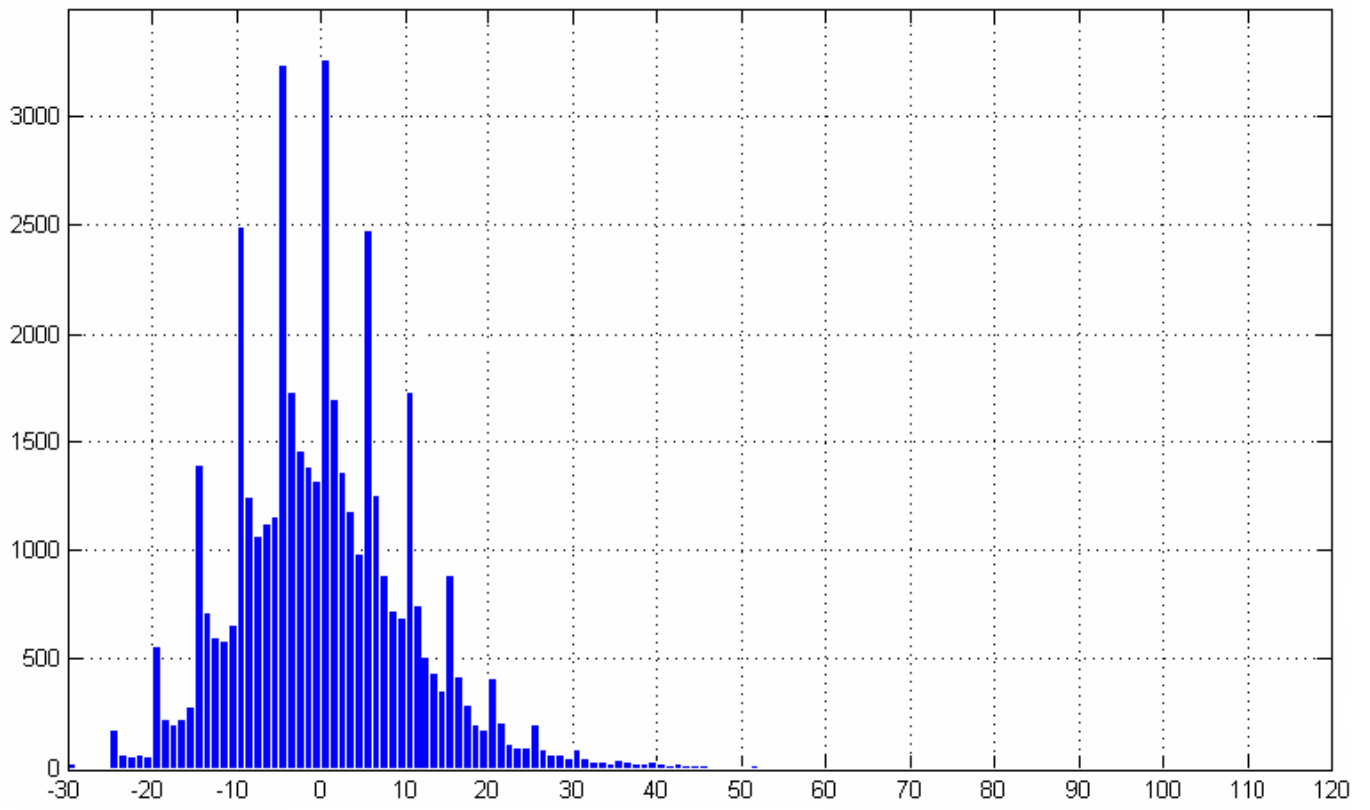
Problem 4:

The first stage of Mathematical Olympiad in Iran is held as a multiple-choice exam between second and third grade high-school students. In 1382, more than 40000 students have participated in this exam. The exam includes 30 questions that are five-choice.

If one chooses correct answer in a question, he (she) will take +4 points and by choosing incorrect answer, he (she) will take -1 points and if no option chooses, then zero point will be taken. Thus the final point for every participant is a number between -30 and 120.

The following diagram shows the bar chart of the obtained points. (Every column is corresponding an integer and its height is the number of students that have taken that point.)

- If someone answer to questions completely random, what point does he (she) expected to take?
- What is your opinion about the hardness of the exam? Why?
- The bar chart have been a little stretched in the right side. What is the reason in your opinion?
- Why are some columns of the bar chart remarkably longer?



(10 points)

