

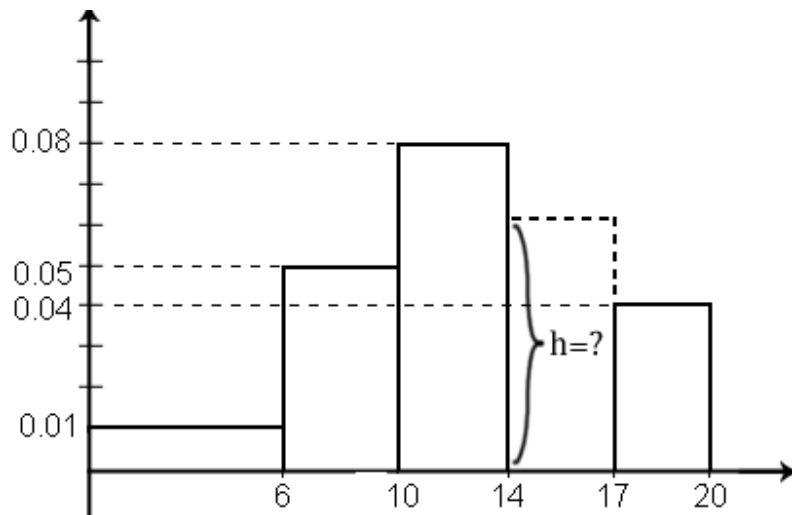
# The Fourth Statistics Competition for High School Students in Isfahan

## (Projects)

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

### Project 1:

Suppose the student marks of a high-school is given as the following rectangular chart, in which the area of each rectangle represents the relative frequency of the corresponding group.



[0,6): very weak

[6,10): weak

[10,14): medium

[14,17): good

[17,20]: very good

- What is the height,  $h$  of the fourth rectangle?
- Determine the mean  $\bar{x}$  of class grades.
- What is the average of accepted students? (The minimum mark for acceptance is 10.)
- Determine the central angle of "good" marks in the circular (or pie) chart.
- What is the probability that a student with the mark greater than 14, be in the very good group?
- If three students are selected randomly, what is the probability that at least two of them are rejected?

(15 points)

**Project 2:**

1. A teacher of the fourth in elementary school intends to select a representative among 20 students of the class, using the list of students and before entering the class. If the teacher has no familiar with students, and do not care about the scientific and moral records of the students, what is the chance of selection of “Hassan Emami”?
2. If the teacher wants to select this representative by means of an election among the class students, that their names are given below, and if “Ahmad Masoodi, Hassan Emami, Jafar Emami” are candidates for this election, how should the teacher the election to have fair results?

Saeid Afzal	Jafar Emami	Hassan Emami	Saeid Goodarzi
Reza Hassankhah	Reza Koochi	Mahmood Mahmoodian	Reza Mohammadi
Hassan Mostajeran	Ahmad Masoodi	Hamed MAtlab	Iraj Nazemi
Taghi Namazi	Reza Rostami	Mohsen Rafighi_e Asl	Masood Shahtalebi
Jafar Sharifi	Taghi Shahsavari	Mohsen Taghavitalab	Masood Vatankhah

3. A night before the election Mohsen Rafighi-e Asl solved a problem and all of the three candidates want him to have the solution. But he wants to give the solution to whom that have more chance in the election. If he has the phone numbers of all his classmates, but his family allow him to call at most 5 phone numbers, then what does Mohsen do? (Note that some students can make no vote or declare the other names that are not candidates.)
4. Determine the sample space of both experiences?
5. Find the probability of the following events in both cases that the teacher selects or the students select.
  - a) One of the person with the family “Emami” is selected?
  - b) The person who is selected has the name “Mohsen”?
6. According to the data gathered by Mohsen, draw a scatter diagram for the votes.

(20 points)