One-Dimensional Data Analysis Quiz

I. Multiple-choice question (Each question has at least one correct answer.)

( ) 1. What is the median of the following scores?

50, 60, 67, 62, 66, 57, 58, 59, 64, 70

(1) 59 (2) 60 (3) 61 (4) 62 (5) 64

Ans: (3)

( )2. Given n data $3x_1^2-5,\ 3x_2^2-5,\ 3x_3^2-5,\ \ldots,\ 3x_n^2-5$ with range of 60, an arithmetic mean of 50, a median of 55 and a standard deviation of 5. What is the statistical measures of the transformed data:

$-2x_1+3,\ -2x_2+3,\ -2x_3+3,\ \ldots,\ -2x_n+3$?

(1) Range is -120 (2) Arithmetic mean is -97 (3) Median is -110

(4) Standard deviation is -10 (5) Variance is 10

Ans: (2)

( )3. In a class of 15 students, the average score on a math quiz was 50, with a standard deviation of 20. The scores were not very ideal, but the students were very diligent in class, the math teacher decided to add 20 points to each student's score. However, for tow students whose original scores were 90 and 100, their adjusted scores are recorded as 100. The adjusted scores of the other students did not exceed 100. Which of the following options best describes the adjusted standard deviation σ?

(1) $15<\sigma\le 16$ (2) $16<\sigma\le 17$ (3) $17<\sigma\le 18$

(4) $18<\sigma\le 19$ (5) $19<\sigma\le 20$

Ans: (1)

( )4. In a class of 41 students, the average score on a certain exam was 64, with a highest score of 97 and a lowest score of 24. To adjust the score linearly (new score = $a+b\times$ onrginal score, where $b>0$) so that the highest score becomes 100 and the lowest score becomes 50, which of the following statements is correct?

(1) The average of the new scores is lower than the average of the original scores.

(2) The median of the new scores is the same as the median of the original scores.

(3) The median of the new scores is higher than the median of the original scores.

(4) The standard deviation of the new scores is the same as the standard deviation of the original scores.

(5) The standard deviation of the new scores is greater than the standard deviation of the original scores.

Ans: (3)

( )5. According to over a hundred years of meteorological record(氣象紀錄), the average annual rainfall(降雨量) in a certain area is 41.0 inches with standard deviation of 6.1 inches. If the unit of this statistical data is converted from imperial to metric, what is the closest standard deviation in millimeters for the annual rainfall in that city? (Note: 1 inch equals 25.4 millimeters.)

(1) 1041 millimeters

(2) 155 millimeters

(3) 6.10 millimeters

(4) 1.61 millimeters

(5) 0.240 millimeters

Ans: (2)

II. Other question

1. The following table shows the scores that 50 students get in a quiz:
   What is the median of these students' quiz scores? Ans: 65

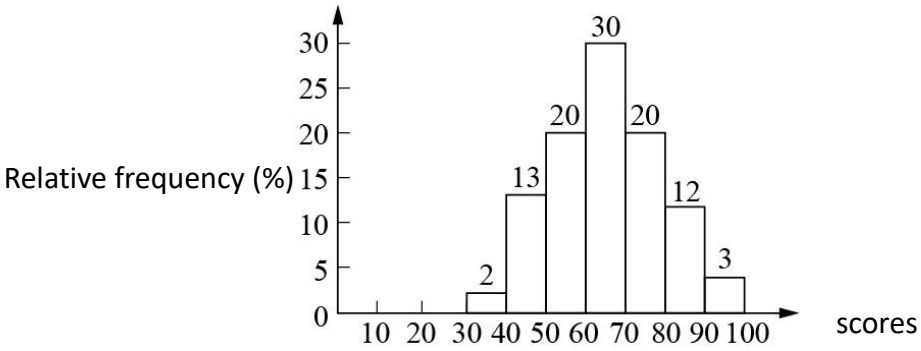
Score	30	40	50	60	70	80	90	100
Number of students	2	3	8	12	15	8	1	1

2. Statistics for a certain region show that the growth rates of population in 2022 and 2023 were 25% and 28%, respectively. If the average growth rate for the population over the three years 2022, 2023, and 2024 must be greater than or equal to 40%. What must the population growth rate for 2024 be at least?
   Ans: 71.5%

3. Given the heights of 10 students on the school team as 171, 171, 172, 173, 175, 175, 177, 178, 179, 179, calculate:
   (1) Arithmetic mean (2) Median (3) Standard deviation (4) Range
   Ans: (1) 175 (2) 175 (3) 3 (4) 8

4. Given the following data for two groups of students in a class:
   Group A has 10 students with an average score of 80 and a standard deviation of 14; Group B has 20 students with an average score of 65 and a standard deviation of 11. What is the average score and the standard deviation for the 30 students in the class?
   Ans: average score(mean): 70, standard deviation: 14

5. Given the relative frequency histogram of the English exam scores for 1000 students at certain school, answer the following:



(1) What is the number of students who scored 60 or above?

(2) Students scoring within the top 6% will receive a certificate. What is the minimum score required to be among the top 6%?

Ans: (1) 650 (2) 87.5

6. (Challenge)

Given n data $x_1, x_2, x_3, ..., x_n$ with an arithmetic mean of k($k > 0$) and a standard deviation of 4, if the arithmetic mean of the transformed data values:

$3x_1^2 - 5,\ 3x_2^2 - 5,\ 3x_3^2 - 5,\ ...,\ 3x_n^2 - 5$ is 118, find the value of k.

Ans: k=5

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