

Unit 1A Review

AP Statistics - Mr. Levy

Instructions: The following questions cover the main ideas of Unit 1A. Be ready to defend your answers out loud.

Quiz: Friday, September 4.

1. Three instructors are comparing scores on their final exams. Each had **99 students**.

A One student scored 1, another scored 99, and the other 97 all scored 50.

B 49 students scored 1, one student scored 50, and 49 students scored 99.

C One student scored 1, another 2, another 3, and so on, all the way through 99.

Fill in the table by reasoning — you should not need to compute a standard deviation.

Class	Mean	Range	Standard deviation (rank 1–3, largest first)
A			
B			
C			

2. “More than 60% of the students scored below the mean on the last test.”

Can this statement be true? If it cannot, explain why not. If it can, describe a distribution that would do it.

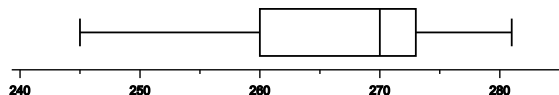
3. A distribution has a **median of 270** and an **interquartile range of 20**. Write **T** or **F** in each blank.

_____ *I.* Fifty percent of the data are greater than or equal to 270.

_____ *II.* Fifty percent of the data are between 260 and 280.

_____ *III.* Seventy-five percent of the data are less than or equal to 280.

4. A national assessment calculated a state-by-state average mathematics proficiency score for eighth graders. The boxplot shows the distribution of those 50 state averages.



Average mathematics proficiency score, by state

Write **T** or **F** in each blank.

_____ *I.* The state score 273 is at the 75th percentile.

_____ *II.* The mean state score is 270.

_____ *III.* The lowest state score is 245.

5. A data set includes two outliers, one at each end. Both outliers are removed. Check every result below that is **possible**.
- ☐ Both the mean and the standard deviation are unchanged.
 - ☐ Both the median and the standard deviation are unchanged.
 - ☐ Both the mean and the median are unchanged.
 - ☐ Both the mean and the standard deviation increase.

6. A list has 10 numbers. Each number is 1, 2, or 3. The mean is 2 and the standard deviation is 0. **What is the list?**

7. Ten students at an Australian high school were surveyed at random.

student_id	Age (years)	Height (cm)	Sleep last night (hours)	Travels to school by
48199	16	168	7.5	Bus
13725	17	175	6.0	Car
84608	16	162	8.0	Walks
22136	16	181	5.5	Bus
40670	17	17	7.0	Car
92143	17	178	6.5	Bus
35369	16	165	9.0	Walks
79473	18	183	5.0	Bike
18046	17	170	7.5	Bus
64652	16	174	6.0	Car

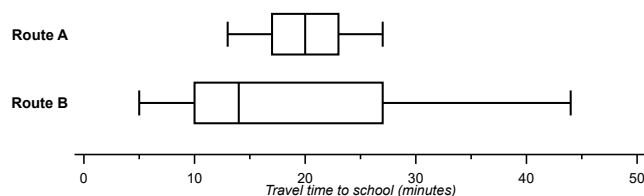
- a) What variables were measured? Identify each as categorical or quantitative.
 - b) There is at least one suspicious value in the table. Identify it and explain what makes it suspicious.
 - c) Would you delete that row, correct it, or leave it alone? Defend your choice.
8. In each pair, one number is the mean and the other is the median. Predict which is which, and prepare to defend your reasoning.
- a) The times it takes the faculty at this school to drive to work: **40 minutes** and **25 minutes**.
 - b) The selling prices of existing single-family homes sold in one month: **\$263,000** and **\$224,000**.

9. The histogram shows the domain-name lengths, in letters, for the 500 most popular websites (not counting the .com or .org).



- a) Estimate the mean and the median. Explain your method clearly.
- b) If you wanted to argue that *shorter domain names are more popular*, which measure of centre would you quote? Justify your choice.
10. Of 500 students whose mean height is 67.8 inches, 150 are girls. If the mean height of the girls is 63 inches, what is the mean height of the boys?
11. Here are the numbers of minutes 15 students spent on homework last night.
35 20 25 35 45 20 50 35 30 80 40 20 50 20 50
- a) Use the **$1.5 \times \text{IQR}$ rule**. Show the fences. Any outliers?
- b) Use the **2 standard deviation rule**. Show the bounds. Any outliers?
- c) Do your two answers agree? Explain what that tells you about deciding whether a value is an outlier.

12. Students on two bus routes recorded how long it took them to get to school.



- a) Compare the two distributions in context.

- b) Describe a situation in which Route A would be the better choice, and a different situation in which Route B would be.

13. At a track meet, the 400 m times had a mean of **58.0 seconds** with a standard deviation of **3.0 seconds**. The 800 m times had a mean of **142.0 seconds** with a standard deviation of **8.0 seconds**.

- a) Maya ran the 400 m in 53.5 seconds. Jordan ran the 800 m in 128.0 seconds. Find both z-scores, and say who had the better run relative to their own event.

- b) A third runner has a z-score of **+2.00** in the 400 m. What was her time, and was that a good run? Explain.

14. A class weighed their backpacks in kilograms and found a mean of **6.5 kg**, a standard deviation of **1.8 kg**, a median of **6.2 kg** and an IQR of **2.5 kg**. To report the results in pounds, every weight is multiplied by 2.2.

- a) Give the mean, standard deviation, median and IQR in pounds.

- b) One backpack was at the 80th percentile in kilograms. What percentile is it in pounds? Explain.