

1 point deduction if you do not circle class time

1. [ 4 points] Two science classes took midterm exams that were graded out of a maximum of 100 points.

	Minimum	Maximum	Mean	Standard Deviation	Number of Students
Biology Exam	57	97	81	6	41
Chemistry Exam	52	92	79	7	34

- a. Using the most appropriate measure of variation in data, which class exhibits more variation in the grades?  
 A. Both the same    B. Biology    **C. Chemistry**    D. Not enough information to determine

ANSWER: C (standard deviation is higher)

- b. For the biology class, find the value that is 1.2 standard deviations below the mean.  
 Show work; Round to one decimal place (tenths)

$$81 - (1.2)(6) = 81 - 7.2 = 73.8$$

2. [ 4 points]

Juan, Kenji, and Lamar have entered bicycle races. The races for each age group are different lengths. Juan is 8 years old. Kenji is in 11 years old. Lamar is 13 years old.

We want to compare who (Juan, Kenji, or Lamar) does best in his own race, compared relative to the other children in their same age group.

Age Group	Time for all participants in age group		Time for this child participating in the race.	
	Average Time (mean)	Standard Deviation	Child in race	Time in minutes this person took to complete the race
Age 8	6 minutes	1	Juan	5.2
Age 11	15 minutes	3	Kenji	11
Age 13	12 minutes	2	Lamar	9

\*Recall that when racing, the best times are shorter times which are faster.

Whose racing time is the best compared relative to the other children in the same race for their age group?

State your conclusion and show your work to justify your answer.

**LAMAR**

You must show correct work for credit – no correct work earns no credit, even if conclusion is correct. Show all calculations accurate to two decimal places.

$$\text{Juan: } z = \frac{(5.2 - 6)}{1} = -.8$$

$$\text{Kenji: } z = \frac{(11 - 15)}{3} = -1.33$$

$$\text{Lamar: } z = \frac{(9 - 12)}{2} = -1.5$$

Lamar's z-score is lowest. He is most standard deviations below average compared to Juan & Kenji. \* (Lower race times are faster, shorter, so are better)

TURN PAGE OVER FOR QUESTION #3 (12 points total)

# Pink form B

Form B

3. The Superintendent of an elementary school district was investigating the number of students per class. She collected data for a random sample of 20 classes from the district's schools.

The data are summarized in the table below

X = number of students in the class	Frequency = number of classes	Relative Frequency	Cumulative Relative Frequency
16	2	0.1	0.1
25	5	0.25	0.35
26	4	0.2	0.55
29	1	0.05	0.6
30	5	0.25	0.85
32	2	0.1	0.95
35	1	0.05	1

1 varstats L1, L2  
or  
1 varstats  
Xlist L1  
freq L2

a. [ 4 points] Find the IQR, mean, and appropriate standard deviation for this data.

Round mean and standard deviation to 2 decimal places ( \_ \_ hundredths).

Incorrect rounding may be interpreted as an incorrect answer and may lose points.

→ IQR = 5      Mean = 26.95 =  $\bar{X}$       Appropriate Standard Deviation = 4.75 = S  
 $Q3 - Q1 = 30 - 25$

b. [ 2 points] Find the class size that is the 20<sup>th</sup> percentile : 25 students per class.

First line after passing .20 in cumulative relative freq. column

c. [ 2 points] The 90<sup>th</sup> percentile is a class size of 32 students. Write the two complete sentences that interpret the meaning of the 90<sup>th</sup> percentile in the context of this problem.

90% of the classes had 32 students or less

10% of the classes had 32 students or more

d. [ 4 points] Are there any outliers?

State your conclusion identifying what are the class sizes for all outliers or stating that there are no outliers.

Show work to justify your answer.

You must show correct work for credit in part d- no correct work earns no credit, even if conclusion is correct.

$IQR = Q3 - Q1 = 30 - 25 = 5$

Lower Fence:  $Q1 - 1.5 IQR = 25 - 1.5(5) = 17.5$

Upper Fence:  $Q3 + 1.5 IQR = 30 + 1.5(5) = 37.5$

The two classes with 16 students are outliers

They are outside the fences.

All other data values are within the fences.