**Math 10 Winter 2019** **Name: Last** 11:30 **First** Key A Yellow

**Quiz Chapter 2 Form A** **Circle Class Section/Time** (11:30 (10.17)) ~~12:30 (10:14, 10H.14H)~~

*1 point deduction if you do not circle class time*

1. 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 (L1) | Frequency = number of classes (L2) | Relative Frequency | Cumulative Relative Frequency |
|---|---|---|---|
| 15 | 2 | 0.1 | 0.1 |
| 24 | 5 | 0.25 | 0.35 |
| 25 | 4 | 0.2 | 0.55 |
| 27 | 1 | 0.05 | 0.6 |
| 29 | 5 | 0.25 | 0.85 |
| 30 | 2 | 0.1 | 0.95 |
| 34 | 1 | 0.05 | 1 |

1varstats L1, L2
or
1varstats
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 (Q3-Q1 = 29-24) Mean = 25.8 = $\bar{X}$ Appropriate Standard Deviation = 4.63 = s

b. [ 2 points] Find the class size that is the 20th percentile : 24 students per class.
1st line in table where we pass .20 in cumulative rel freq table

*c. [ 2 points] The *80th percentile is a class size of 29 students. Write the two complete sentences that interpret the meaning of the 90th * percentile in the context of this problem.

*It should have said "80th" in both places

80% of the classes had 29 or fewer students.
20% of the classes had 29 or more students

OR

90% of the classes had 30 or fewer students
10% of the classes had 30 or more students

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 = 29 - 24 = 5

Lower Fence: Q1 - 1.5 IQR = 24 - 1.5 * 5 = 16.5

Upper Fence: Q3 + 1.5 IQR = 29 + 1.5 * 5 = 36.5

The two classes with 15 students are outside the fences, so they are outliers. All other data values are within the fences.

**Turn page over for questions 2 and 3 ( 8 points total)**

Form A Yellow Form A

2. [ 4 points]
Lin, Maria, and Nina have entered bicycle races. The races for each age group are different lengths.
Lin is 7 years old. Maria is 10 years old. Nina is 12 years old.
We want to compare who (Lin, Maria, or Nina) does best in her own race, compared relative to the other children in their same age group.

| | Time for all participants in age group | | Time for this child participating in the race. | |
|---|---|---|---|---|
| Age Group | Average Time (mean) | Standard Deviation | Child in race | Time in minutes this person took to complete the race |
| Age 7 | 5 minutes | 1 | Lin | 4.3 |
| Age 10 | 14 minutes | 2 | Maria | 11 |
| Age 12 | 11 minutes | 3 | Nina | 8 |

* 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. MARIA

*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.*

Show work below:

Lin $z = \frac{(4.3-5)}{1} = -.7$

Maria $z = \frac{(11-14)}{2} = -1.5$

Nina $z = \frac{(8-11)}{3} = -1$

Maria's z-score is the lowest.
She is more standard deviations below average than Lin or Nina.
(* In a race lower times are shorter, faster, so are better.)

3. [ 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 |
|---|---|---|---|---|---|
| Astronomy Exam | 55 | 95 | 77 | 8 | 37 |
| Biology Exam | 57 | 97 | 81 | 6 | 41 |

a. Using the most appropriate measure of variation in data, which class exhibits more variation in the grades?

(A. Astronomy) B. Biology C. Both the same D. Not enough information to determine

ANSWER: A (standard deviation is higher)

b. For the astronomy class, find the value that is 1.4 standard deviations below the mean.
*Show work; Round to one decimal place (tenths)*

$77 + (-1.4)(8) = 77 - 11.2 = 65.8$