Name KEY

Row # (from the door) _____, Seat # (from front) _____

Exam 1

Always show enough of your set up and work to indicate how you arrived at your answer. If it is not clear how you got your answer, you may not get full credit for the problem. (Bonus points = 4)

(5) **I. Identify each variable as A) qualitative ordinal, B) qualitative nominal, C) quantitative discrete or D) quantitative continuous. These variables describe a Golden State Warriors basketball game.**

B 1. A player's position (*e.g.* center, forward, guard …).

C 2. The number of points scored by the Warriors in the first quarter.

D 3. The time played by Steph Curry.

A 4. The identifying numbers on the players jerseys.

B 5. The college that a player had attended.

(6) **II. Create a set of data that satisfy the set of conditions (just make five numbers that satisfy the conditions).**

1. $n = 5$, $\bar{x} = 7$, and $Md = 6$. 2 for med. or mean

e.g. 4, 5, 6, 8, 12

$\Sigma = 35$

2. $n = 5$, $\bar{x} = 7$, and $s = 0$.

7, 7, 7, 7, 7

(16) **III. The following data represents the number of cars sold each day by a dealership on 10 consecutive days. 5, 7, 8, 14, 15, 18, 11, 10, 3, 6**

SHUG = show how you got it

1. compute the mean (Hint: $\Sigma x = 97$)

$\frac{97}{10}$ -1 no show

$\bar{x} =$ 9.7

2. find the median

must at least show ordered set 3, 5, 6, 7, 8, | 10, 11, 14, 15, 18

$\frac{8+10}{2}$

$Md =$ 9

3. find the midrange

$\frac{3+18}{2} = \frac{21}{2}$

midR = 10.5

4. compute the 10% trimmed mean

$\frac{97-3-18}{8} = \frac{76}{8}$

-1 for just 76 + not $\frac{76}{8}$

-2 w/o showing how you got | max -4

$\bar{x}_{trimmed\,10\%} =$ 9.5

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(10) IV. Given the following frequency distribution for the gas mileage of a sample 25 full size automobiles.

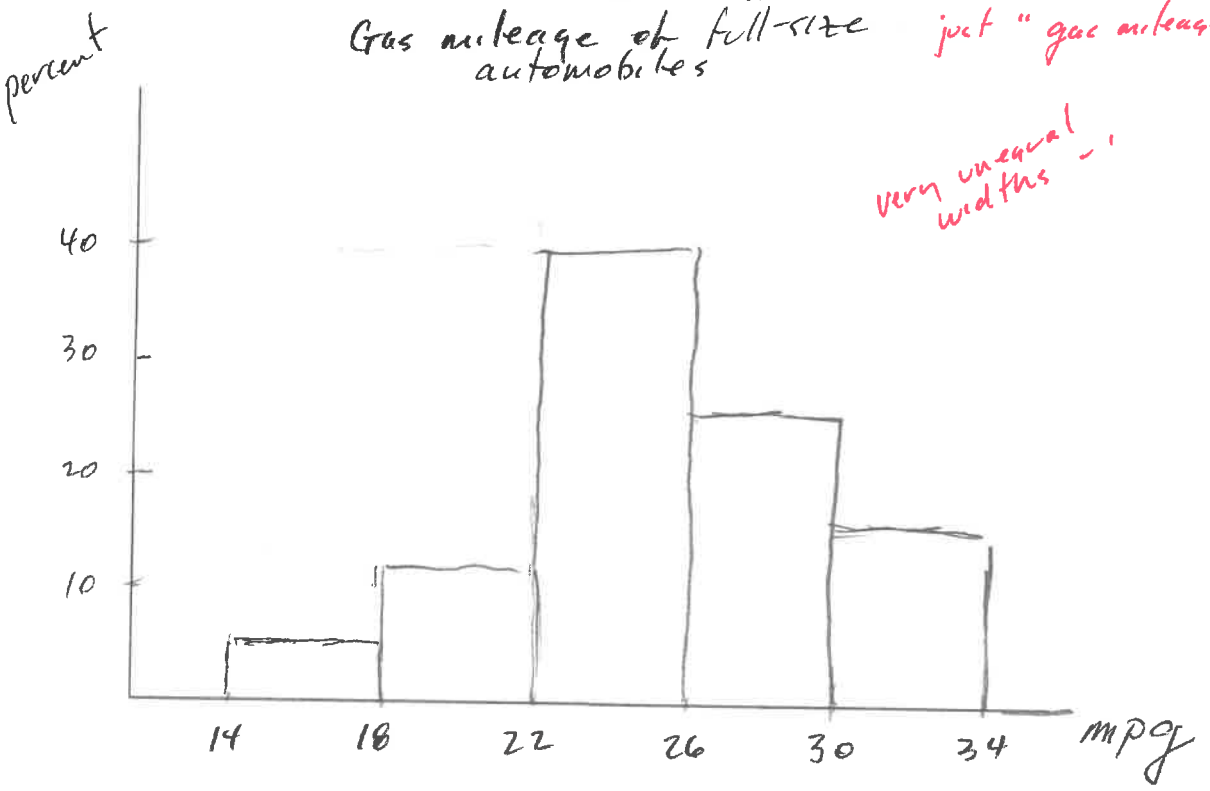
Mileage	Count	Percent (relative freq.) %	Cumulative Frequency
14 – 17	1	4	1
18 – 21	3	12	4
22 – 25	10	40	14
26 – 29	7	28	21
30 – 33	4	16	25
	25	100%	

(2) 1. Fill in the column for the percentages (relative frequencies).

(2) 2. Fill in the column for the cumulative frequencies.

(2) 3. Find the class width. 18 - 14, 22 - 18 .. 4

(4) 4. Construct a histogram for this distribution (label carefully).



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(10) V. Given the data (note that is only a partial set of the data) 14, 16, 23, …,77, 78, 84 and the following five-number summary: 14, 50, 62, 70, 84. Find:

(2) 1. Find the interquartile range, $70-50$ $IQR =$ 20

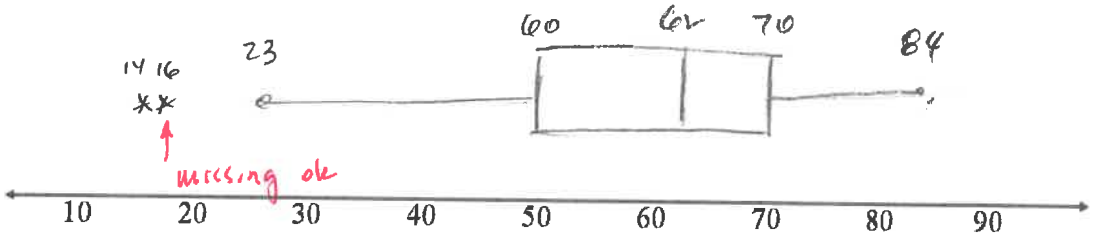
(2) 2. Find the midquartile $\frac{50+70}{2}$ $midQ =$ 60

(2) 3. Based on the 1.5(*IQR*) criterion find the lower and upper fences.

$1.5(20) = 30$

$f_L = 50-30$ $f_U = 70+30$ $f_L =$ 20, $f_U =$ 100

(4) 4. Sketch the boxplot (box-and-whisker plot), (sketch *horizontally*, above the axis, indicting outliers, if there are any, with *). Indicate on the graph the value of all key points: Each of the five-number summary values, the endpoints of the whiskers, and outliers (if any).



(10) VI. Find the following measures for the set of data in the table below.

(3) 1. Compute the mean (show work to indicate how you got it)

$\frac{72}{6} = 12$ $\bar{x} =$ 12

(3) 2. Compute the range(show work to indicate how you are got it)

$18-8$ $R =$ 10

(4) 3. Compute the variance and standard deviation (show work in table below)

x	$x-\bar{x}$	$(x-\bar{x})^2$
8	−4	16
10	−2	4
11	−1	1
12	0	0
13	1	1
18	6	36
Σ 72	0	58

$s^2 = \frac{58}{6-1} = \frac{58}{5} = 11.6$ $s^2 =$ 11.6

$s = \sqrt{11.6} \approx 3.405877..$ $s =$ 3.41 -1

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(6) **VII. Use the Empirical Rule (68-95-99.7% rule) to answer the following questions for the distribution of weights of college men which is approximately normal (bell-shaped) with a mean of 160 lbs and a standard deviation of 10 lbs. (Hint: make a sketch and make use of the symmetry of bell-shaped data.)**

1. Approximately what percentage of the weights will be between 150 and 170 lbs.?

$160 - 10 = 150$ $\pm 1\sigma$ $160 + 10 = 170$ 68%

2. Between what two numbers will there be about 99.7% of all the weights?

$\pm 3\sigma = 30$ $160 - 30$ $160 + 30$ 130 and 190

3. Approximately what percentage of the weights will less than 140 lbs.?

$2\sigma = 20$ $160 - 20 = 140$ 2.5% 2.5% 2.5%

(7) **VIII. The following is a stem-and-leaf display of a random sample of the yield per acre of wine grape vineyards in Sonoma county.**

```
Stem-and-leaf of Weight   N = 25
Leaf Unit = 0.1
```

note: -1 if 1.0

```
 1    1  9
 1    2
 3    2  58
 6    3  034
10    3  5569
(7)   4  0023444
 8    4  55779
 3    5  124
```

unimodal -1 insufficient
bell shape = -1

(2) 1. Describe the shape of the distribution. skewed to the left (negatively)

(5) 2. The five-number summary is: 1.9, 3.45, 4.2, 4.6, 5.4

$\frac{3.4+3.5}{2}$ $\frac{4.5+4.7}{2}$

(3) **IX. For bivariate data, match one of the following with the description below.**

a. scatterplot b. correlation coefficient c. regression equation

b 1. A measure of linear association.

a 2. What we use to try to determine if the two variables are related and how.

c 3. The mathematical model we use to predict a value of the response.

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(9) **X. Given the following set of bivariate data: (4, 15), (5, 12), (6, 18), (6, 20), (8, 22). Enter the data into your calculator and:**

1. Create a scatterplot for this data and when you get it on your screen raise your hand and I will initial it off. see bottom of the page — must have = — not an equation −1 — OK: ____
2. Give the regression equation (*round to nearest hundredth*) $\hat{y} = 4.61 + 2.20x$
3. Give the correlation coefficient (") $r = .82$

(3) **XI. Based on EPA data for 2017 passenger vehicles, gasoline mileage (*M* in mpg) is related to weight of the car, *W* in thousands of pounds – *K-lbs.*) by the regression equation: $M = 44.4 - 7.2W$. The predicted gas mileage of a passenger vehicle that weights 6500 lbs is –2.4 mpg, which of course is impossible. What went wrong in making this prediction with our regression equation?**

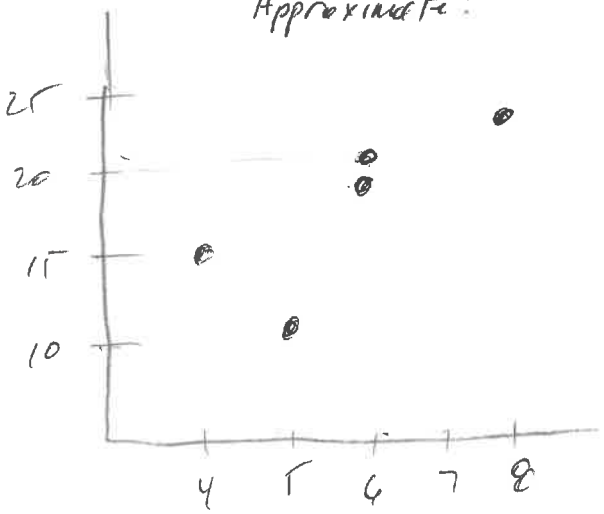
This is an example of extrapolation, 6500 lbs is outside the range of viable values of W.

(3) **XII. A school board member for a California district found that there is a strong positive correlation, $r = 0.83$, between teachers' salaries and sales of marijuana. He argued against giving teachers a raise in salary because this strong positive correlation showed that teachers just spend the extra money they get on marijuana. In what way is the board member misinterpreting what correlation means?**

He is assuming that a high correlation implies a cause-effect relationship which is not necessarily true. Not cause-effect

note: have a high correlation means that they are related but not necessarily in a cause-effect way.

I 1. Approximate:



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(16) XIII. **A software company did a study on how long it took a technical support representative to resolve a particular problem. They found that the time required by the rep to solve problem (T, in minutes) is related to the experience of the rep on the job (E, in weeks of experience). From their data they computed the regression equation, $\hat{T} = 16.7 - 0.7E$ for E from 0 to 10 (after 10 weeks they found very little further improvement) with R^2 =71%.**

1. Identify the

   response variable T (time)

   explanatory variable E (experience)

2. give the slope (*include units*) -0.7 min/week

3. interpret the slope *with respect to this situation and this regression* (your response should have to do the time and experience, be explicit) For each additional week of experience a tech support rep can resolve this particular problem in an average of .7 minutes less time.

4. give the y-intercept (include units) 16.7 minutes

5. Interpret (if possible) the y-intercept *with respect to this situation and this regression* The mean time it takes a tech rep with no experience is 16.7 minutes

6. Find the correlation coefficient, r $r = -\sqrt{.71} \approx -.8426149...$ $-.84$

7. Find the predicted time for a rep with five weeks of experience ($E = 5$).

   $\hat{T}(5) = 16.7 - 0.7(5)$

   $16.7 - 3.5 = 13.2$ 13.2 min.

8. Pat had 5 weeks of experience and their time to resolve this problem was 13 minutes, what was the residual for this rep. $T - \hat{T}$

   $13 - 13.2$ -0.2 min