n = 30
min = 20
max = 94
$\bar{x}$ = 55.5 +20
s = 21.5

TI

Name: Key

Math 63 – Fall 2006
Test #1a

Instructions: Put your name on the top before beginning. On your own paper answer the following. For problems 1-12 number your paper and write the correct word that will best fill in the blank(s). In problems 13-15 show all pertinent work and box your final answer.

Center	Data	Description	Design	Inference
Interval	Nominal	Ordinal	Parameters	Population
Qualitative	Quantitative	Random Sample	Ratio	Sample
Sampling	Shape	Statistics	Variation	

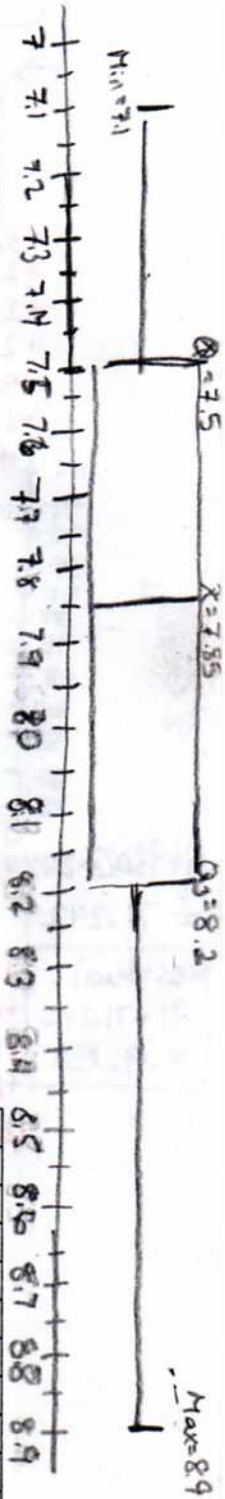
+1 1. The art and science of learning from data is called statistics.
+1 2. The range is a measure of variation.
+2 3. The two main classifications (types) of data are quantitative and qualitative.
+2 4. There are two types of quantitative data. They are ratio and interval
+2 5. The two types of qualitative data are nominal and ordinal.
+1 6. The information that we collect from experiments or surveys is called data.
+1 7. Planning the methods for collecting the data to study the tolerances of ball bearings would be an example of the design aspect of statistics.
+1 8. A stem and leaf plot can be used to see the shape of data.
+1 9. A random sample assures that the sample will be representative of the population.
+1 10. The median is a measure of center.
+1 11. The population parameters can be inferred from sample statistics.
+1 12. After collecting the data it is shown that in a given election 72% of registered voters voted. This is an example of the description aspect of statistics.

Calculation shown + Answer

13. Using the following data which represents the time in hours, that 18 professional fitness experts spend working out.

Stem (x 1)	Leaf (x 0.1)
7	1 1
7	3
7	5 5 5
7	
7	8 8 9 9
8	0 0
8	2 2 2 2
8	
8	
8	9

+2 a) Find the mean of the data. $\bar{x} = \frac{\Sigma x}{n} = \frac{140.2}{18} \approx 7.79$
+1 b) Find the mode of the data. mode = 8.2
+2 c) Find the median of the data (include the indicator function). $\tilde{x} = 7.85$
+2 d) Find the range of the data. Range = 8.9 − 7.1 = 1.8
+4 e) Find the variance and the standard deviation of the data.
+3 f) Find Q_1 and Q_3 (include the indicator function). $Q_1 = 7.5$ $Q_3 = 8.2$
+6 g) Draw a boxplot that represents this data. Make sure that it is scaled
+2 h) Calculate the IQR? 8.2 − 7.5 = 0.7



$50 = \frac{1}{2} \cdot 18 = 9$ & 10

$25 = \frac{1}{4} \cdot 18 = 4.5$ → 5

scale: min, max, Q_1, Q_2, Q_3

$$s^2 = \frac{n\Sigma x^2 - (\Sigma x)^2}{n(n-1)} = \frac{18(1095.94) - (140.2)^2}{18(17)} = \frac{70.88}{306} \approx 0.23$$

19726.92 − 19656.04 = 70.88 ; 18(17) = 306 ; 0.23163398693

$s = \sqrt{s^2} \approx 0.48$; 0.4812836865

36

+1 1. The population parameters can be inferred from sample statistics.

+2 2. The two main classifications (types) of data are quantitative and qualitative.

+2 3. There are two types of qualitative data. They are nominal and ordinal

+2 4. The two types of quantitative data are ratio and interval.

+1 5. The art and science of learning from data is called Statistics.

+1 6. The information that we collect from experiments or surveys is called data.

+1 7. Planning the methods for collecting the data to study the tolerances of ball bearings would be an example of the design aspect of statistics.

+1 8. From past figures, it is estimated that 37% of voters will vote in the November elections. This is an example of the inference aspect of statistics.

+1 9. A random sample assures that the sample will be representative of the population.

+1 10. The mean is a measure of center.

+1 11. The range is a measure of variation.

+1 12. A histogram can be used to see the shape of data.

+2 g) Should we consider the maximum data point to be an outlier? No b/c it is w/in 1.5×IQR = (1.5)(0.7) = 1.05
Use IQR as a criterion.

+2½ h) Using the stem and leaf and the mean and median to support your answer, talk about the skewness of this data. The data is right skewed if we look at the graphics but if we consider the mean & median this isn't the case.

+2½ i) Find the z-score of the 8th data point from the top.

EC) If this data were symmetric, what should you expect the 8th data points z-score to be (approximately)? ≈ 0 since it is near the center of the data.

+2

$$z = \frac{7.8 - 7.79}{0.48} = \frac{0.01}{0.48} \doteq 0.02$$

14. For the following data which the dependent variable represents the percentage grades for 15 randomly chosen statistics students. The independent variable is the number of absences for each student.

X	Y
5	79
6	78
2	86
12	56
9	75
5	90
8	78
15	48
0	92
1	78
9	81
3	86
10	75
3	89
11	65

+3 a) Draw a scatterplot for the data. scales x, scale y, ordered pairs

+2 b) Do you see any correlation? Is it positive or negative or zero? Yes Neg.

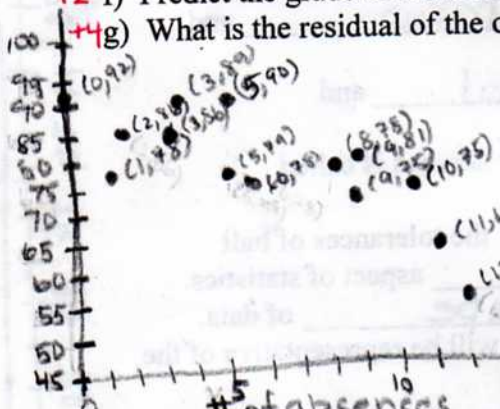
+2 c) Find the measure of the correlation – r. $r = \frac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{n\Sigma x^2 - (\Sigma x)^2}\sqrt{n\Sigma y^2 - (\Sigma y)^2}}$

+2 d) What is r^2 and what does it measure?

+5 e) Find the regression equation for this data. +2 a, +2 b & +1 eq.

+2 f) Predict the grade of a student that has missed 3 days of class. work & score

+4 g) What is the residual of the observed (9, 81)? pred., resid.



$$r = \frac{15(6973) - (99)(1156)}{\sqrt{15(925) - 99^2}\sqrt{15(91246) - 1156^2}}$$

104595 − 90441 = 14444

13875 − 9801 = 4074

63.83

1366810 − 1336336 = 32354

179.87

$r \doteq -0.85$

$r^2 = 0.736$ The variation predicted by the regression equation.

$\hat{y} = 93.022 - 2.42(9)$

$\hat{y} \doteq 71.242$

Residual: 81 − 71.242 = 9.758

b = slope $= \frac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2} = \frac{15(6973) - (99)(1156)}{15(925) - (99)^2} = \frac{-9849}{4074} \doteq -2.42$

−0.8578624029 = 13 − 9849 / 11480.86216

−2.417525773

a = y-intercept $= \bar{y} - b\bar{x} = 77.0667 - (-2.417525773)(6.6) \doteq 93.022$

$\hat{y} = 93.022 - 2.42x$

$\hat{y} = 93.022 - 2.42(3)$

$= 93.022 - 7.26$

$= 85.762$

≈ 86%

15. For the following frequency table representing 100 people's systolic blood pressure in mmHg. The ages of the people in this study were 25-40 years old.

Class (mmHg)	Frequency
100-109	15
110-119	35
120-129	25
130-139	15
140-149	8
150-159	2

+2 a) Find the class width. 110 − 100 = 10

+1 b) What is the lowest class boundary? 99.5

+1 c) What is the 1st class midpoint? 104.5

+1 d) What is the last class' upper class limit? 159

+4 e) Draw a histogram for this data. Label it correctly. Boundaries or Midpoints, Counts, Bars, No Gaps