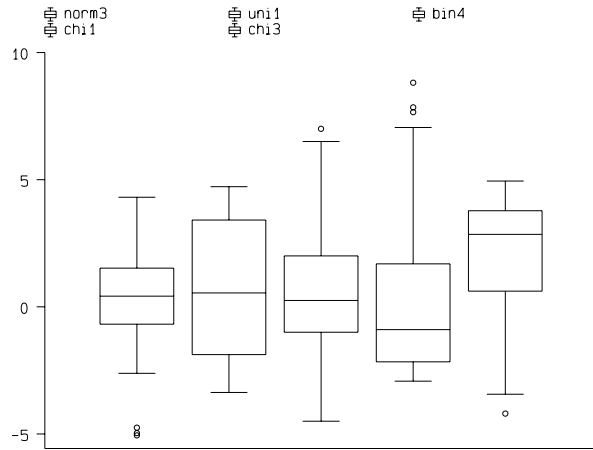


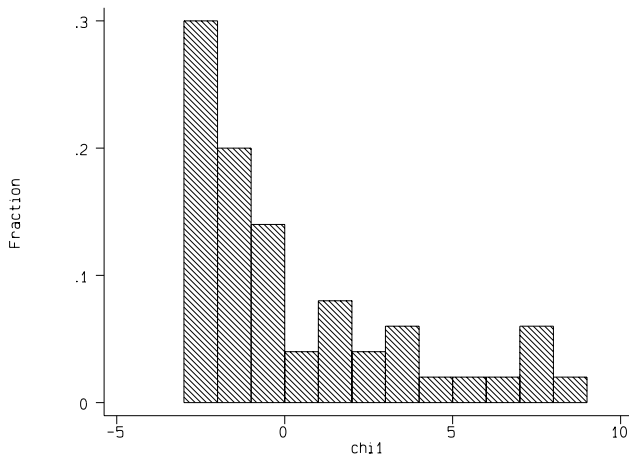
STAT302: Secs 102 & 103  
Summer I 1997  
Exam #1  
**Form A**

Instructor: Julie Hagen Carroll

1. **Don't even open this until you are told to do so.**
2. Be sure to mark your section number (102 or 103) and your test form (A, B, C or D) on the scantron!
3. Sign your name where indicated on your scantron and write your Tuesday section number and computer number beside it. Also, you must place your scantron in the correct section stack (for next Tuesday).
4. There are 20 multiple-choice questions on this exam, each worth 5 points. There is partial credit. Please mark your answers **clearly** on the scantron. Multiple marks will be counted wrong.
5. You will have 60 minutes to finish this exam.
6. If you are caught cheating or helping someone to cheat on this exam, you both will receive a grade of **zero** on the exam. You must work alone.
7. This exam is worth 100 points, and will constitute 20% of your final grade.
8. Good luck!



- Numbering the boxplots above from left to right as 1 through 5, which of these is most likely normal?
  - 1, 2, and 3 are normal because they are symmetric.
  - Only 2 is normal since 1 and 3 have outliers.
  - 1
  - 3
  - 1 and 3



- Which boxplot corresponds to the histogram above?
  - 4
  - 5
  - Either 4 or 5 could be the data in the above histogram.
  - Boxplot 4 is skewed right like the histogram above, but the range is different.
  - None of the above.

- Suppose you have a friend in a different section of STAT302, and you want to compare your relative standings in the class. You are doing better since your  $z$ -score is 1.5 and your friend's is -1.0. The other instructor decides his class' grades are too low, so he adds 5 points to each student's score. How do your  $z$ -scores compare now?
  - Your friend's  $z$ -score is 4.0, so he's now doing better than you are.
  - Your friend's  $z$ -score is 4.0, but since everyone in his class *shifted* up, your relative standings are the same, and you are still doing better.
  - You can't compare your relative standings since the classes have different averages.
  - Your friend's  $z$ -score is still -1.0, but now he's 2.5 points above you.
  - Your friend's  $z$ -score is still -1.0, so you are still doing better.

- Which of the following is NOT a numerical variable?
  - the number of days it rains this semester
  - the number of Aggies from San Antonio currently enrolled
  - the number of Aggies who drive pickups
  - the types of pickups available
  - At least two of the above are catagorical variables.

Percentiles	Smallest		
1%	-5.057517	-5.057517	
5%	-3.051402	-3.969009	
10%	-2.295184	-3.051402	Obs 50
25%	-.6847893	-2.61507	Sum of Wgt. 50
50%	.4174089		Mean .2831798
			Largest Std. Dev. 1.91481
75%	1.522842	2.998814	
90%	2.645255	3.379243	Variance 3.666496
95%	3.379243	3.599591	Skewness -.4182985
99%	4.309381	4.309381	Kurtosis 3.353038

- How many outliers are there in the output above?
  - None
  - 1
  - 2
  - 3
  - 4

6. Remembering that the *yellow* boxes represent the sample means, in the *Random Sampling Lab*, we saw that

- A. as the sample size  $n$  increases, the sample means increase.
- B. as the sample size  $n$  increases, the sample means decrease.
- C. as the sample size  $n$  increases, the sample means' range increases.
- D. as the sample size  $n$  increases, the sample means' range decreases.
- E. as the sample size  $n$  increases, the sample means look more like the *blue* boxes.

7. The Method of Least Squares

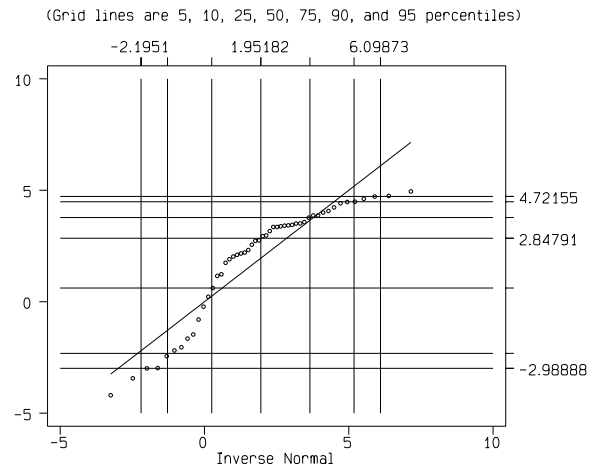
- A. minimizes the sum of the squared vertical deviations from the points on the line.
- B. minimizes the sum of the squared horizontal deviations from the points on the line.
- C. minimizes the correlation coefficient between  $x$  and  $y$ ,  $r$ .
- D. maximizes the coefficient of determination,  $r^2$ .
- E. Exactly two of the above are correct.

8. Suppose your dataset consists of 25  $(x, y)$  pairs. If you add 5 to the  $y$ 's then,

- A.  $\bar{y}$  will increase by 5, but  $s_y$  will stay the same.
- B.  $\tilde{y}$  will increase by 5, but the IQR of  $y$  will stay the same.
- C. the intercept of the regression line,  $b_0$  will increase by 5, but the slope,  $b_1$  will stay the same.
- D. All of the above are true.
- E. Exactly two of the above are true (excluding D.).

9. If the grade distribution for this exam is approximately normal,  $\bar{x} = 80$  and  $s_x = 3$ , approximately what grade must you make in order to be in the top 10%, but not the top 3%? (Pick the closest)

- A. between 80 and 83
- B. between 83 and 86
- C. between 86 and 89
- D. between 77 and 80
- E. between 74 and 77



10. Assuming the mean,  $\bar{x} = 0$ , and the standard deviation,  $s_x = 3$  (these aren't exactly right, but close), approximately what percent of the data represented above will be between  $(-6, 6)$ ?

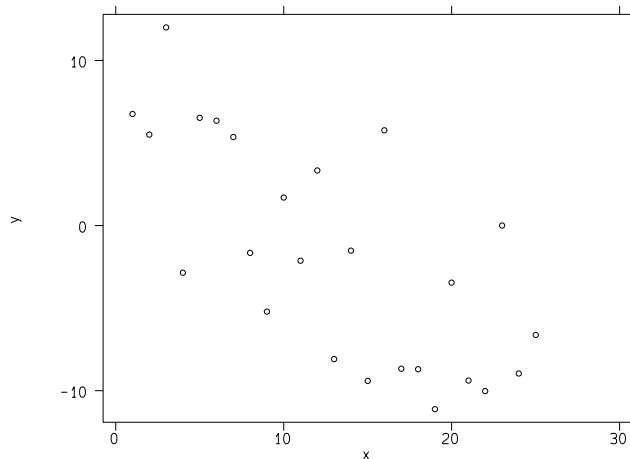
- A. approximately 95%
- B. approximately 68%
- C. no more than 75%
- D. at least 75%
- E. about 89%

11. Which type of graph *best* determines if a dataset is approximately normal or not?

- A. if a histogram is bell-shaped
- B. if a boxplot is symmetric
- C. if a normal quantile plot is linear
- D. if the Empirical Rule works
- E. None of the above

12. Both the coefficient of determination,  $r^2$ , and the standard deviation about the least squares line,  $s_e$ , help determine how closely the line fits the data. Which of the following best describes their relationship?

- A. As  $r^2$  approaches 1,  $s_e$  approaches 0.
- B. As  $r^2$  approaches 0,  $s_e$  approaches 1.
- C. As the points fall closer to the line,  $r^2$  approaches  $s_e$ .
- D. As the points fall closer to the line,  $r^2$  approaches  $s_y$ .
- E. Exactly two of the above are correct.



13. What is the approximate correlation coefficient of the data pictured above?

- A. -0.9
- B. -0.7
- C. between  $\pm 0.5$
- D. 0.7
- E. 0.9

14. Suppose you know that a dataset is highly skewed to the left (negatively skewed) and the median  $\tilde{x} = 5$ . Then

- A. the mean,  $\bar{x} < 5$ .
- B. the mean,  $\bar{x} > 5$ .
- C. the mean,  $\bar{x} = 5$ .
- D. the mean,  $\bar{x}$  cannot be determined.
- E. There is no relationship between  $\tilde{x}$  and  $\bar{x}$ .

15. Suppose you can predict  $y$  from  $x$  using:  $\hat{y} = 9 - 0.5x$ . What is the residual at the point (3, 8)?

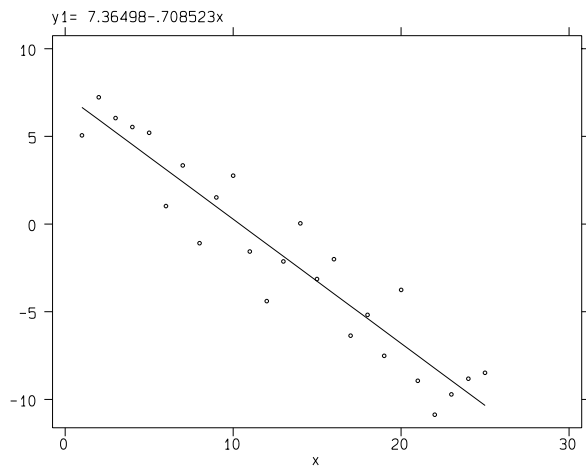
- A. 7.5
- B. 10.5
- C. 0.5
- D. -0.5
- E. -2.0

16. Increasing the sample size  $n$ ,

- A. causes  $\bar{x}$  to vary less about  $\mu$ .
- B. causes the sample regression line to vary less about the population regression line.
- C. makes the distribution of a dataset easier to determine.
- D. makes the correlation between  $x$  and  $y$  easier to determine.
- E. All of the above are true.

17. Which of the following best describes a *simple random sample* of size  $n$ ?

- A. all  $n$  observations have different values
- B. all possible samples of size  $n$  are just as likely
- C. all possible values of the population are just as likely
- D. all  $n$  observations have the same value
- E. random implies it cannot be determined



18. If the point (5, -10) is added to the data above, which of the following will happen?

- A. the means of  $x$  and  $y$ ,  $\bar{x}$  and  $\bar{y}$ , will decrease
- B. the standard deviations  $x$  and  $y$ ,  $s_x$  and  $s_y$ , will decrease
- C. the correlation coefficient between  $x$  and  $y$ ,  $r$ , will get closer to 0
- D. All of the above will happen.
- E. Exactly two of the above will happen (excluding D.).

19. Suppose the correlation coefficient of  $x$  and  $y$ ,  $r = -0.99$ . This means that

- A. either  $x$  causes  $y$  or  $y$  causes  $x$ .
- B. as  $x$  moves further from  $\bar{x}$ ,  $y$  moves closer to  $\bar{y}$ .
- C. if  $x$  is greater than  $\bar{x}$ ,  $y$  is smaller than  $\bar{y}$ .
- D. All of the above are true.
- E. Exactly two of the above are true (excluding D.).

20. Which of the following is NOT a population parameter?

- A.  $\sigma$
- B.  $\bar{x}$
- C.  $\rho$
- D.  $\pi$
- E.  $\beta_0$

**Answers:**

1. E 2. A 3. E 4. D 5. B 6. D 7. E 8. D  
9. B 10. D 11. C 12. A 13. B 14. A 15. C  
16. E 17. B 18. E 19. C 20. B