Statistics ~ Business Statistics

SAMPLE TEST 1

(Revised Summer, 2008)

Answer these questions.

1. Statistics was first developed in the border between what two centuries?

2. What was one of the problems that originally led to the development of statistics?

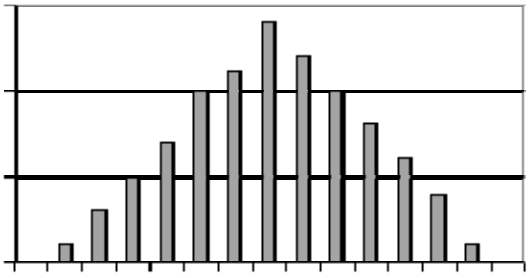
3. Name any of the problems that statistics was applied to later (in the 19th or 20th Centuries).

4. What does the word **significant** mean in statistics?

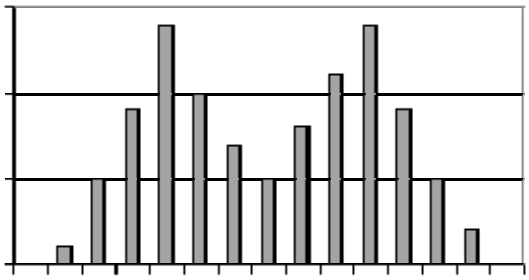
MATCHING: Write the letter of the best answer on the line.

A. bimodal distribution
B. normal distribution
C. uniform distribution
D. skewed distribution

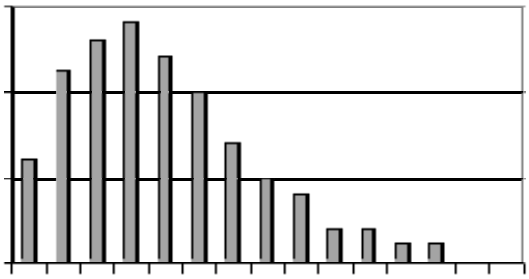
_____5. ↓



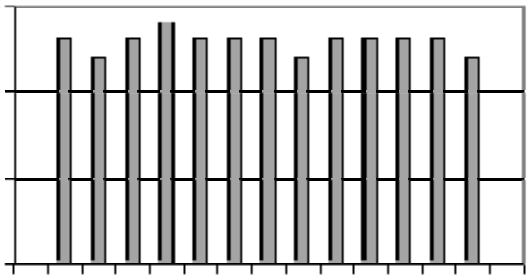
_____7. ↓



_____6. ↓



_____8. ↓



MATCHING: Write the letter of the best answer on the line.

A.	descriptive statistics	D.	ogive	G.	population
B.	gap	E.	outlier	H.	relative frequency
C.	inferential statistics	F.	parameter	I.	sample
				J.	statistic

_____9. a piece of data that is much larger or smaller than the rest of the data

_____10. a small group that represents the population

_____11. the branch of statistics where you organize and describe data

_____12. a piece of information about the population

_____13. a piece of information about the sample

_____14. the branch of statistics where you interpret and make decisions

_____15. a line graph that shows the cumulative frequency over time and never decreases

_____16. a large group about which you want to find out information

_____17. the percent (or fraction of a sample) that falls within a given category or range

MATCHING: Write the letter of the best answer on the line.

A.	coefficient of variation	D.	median	G.	range
B.	frequency	E.	midrange	H.	standard deviation
C.	mean	F.	mode	I.	trimmed mean
				J.	variance

_____18. the square of the standard deviation

_____19. the number of data that falls within a given category or range

_____20. $\bar{x}$ or μ … the arithmetical average of the data

_____21. removing a percentage of the top and bottom scores and averaging the remaining data

_____22. measure of dispersion that expresses the spread of the data as a percent of the mean

_____23. σ or s or Sx … the average distance the data are from the mean

_____24. $\tilde{x}$ or Med … the exact center of the data—same number of scores higher and lower

_____25. the most common score in a set of data

_____26. the distance between the top and bottom numbers in a set of data

_____27. halfway between the top and bottom numbers in a set of data

Which method of gathering data is used in each example below?

A. census B. experiment C. sampling D. simulation

_____28. finding the average age of students at Iowa Lakes by asking the registrar for a list of the ages of all ILCC students

_____29. investigating the effect of environmental damage caused by a factory by creating a computer model of the factory and its surrounding area.

_____30. seeing if a new AIDS drug works by giving traditional AIDS treatment to 40 patients and the new drug to 40 other patients, and then comparing how each group did

_____31. finding out how often the word “love” is used in the Bible by searching through the entire Bible to find occurrences of the word “love”

_____32. finding out the average caffeine in a coffee by doing chemical tests on 8 different cups of coffee

_____33. using one type of fertilizer in one field and a second type of fertilizer in another field to see which works better

Which type of data is used in each example below?

A. nominal B. ordinal C. interval D. ratio

_____34. the number of potato chips a person eats in a day

_____35. the reading level of a book: easy, intermediate, or advanced

_____36. the number of days in a month

_____37. favorite sport: baseball, football, basketball, hockey, track, golf, tennis, or auto racing

_____38. rating of a movie: G, PG, PG-13, R, NC-17

_____39. the entrée selected by a guest at a wedding banquet: beef, chicken, fish, or vegetarian

Which type of sample is used in each example below?

A. convenience C. random E. systematic
B. cluster D. stratified

_____40. calling every seventeenth name in the telephone book

_____41. deciding who is in a treatment group and who is in a control group by flipping a coin for each person: heads=treatment, tails=control

_____42. choosing a sample that includes children, young adults, middle-aged people, and senior citizens in the same proportion as the United States as a whole

_____43. test marketing a new product in Peoria, Cedar Rapids, and Columbus, because you think these three cities are “typical” places that represent the country as a whole

_____44. asking six people who work at the same place you do

_____45. choosing a stock portfolio by dividing all companies into conservative, moderate risk, and high risk, and then selecting stocks from each group

MATCHING: Write the letter of the best answer on the line.

A. bar graph B. circle graph C. line graph

_____46. type of graph that is best suited to showing percentages of things in various categories

_____47. type of graph that is best suited to showing the number of things in various categories

_____48. type of graph that is best suited to showing changes in something over time

49. Make a ***stem-and-leaf plot*** to represent the data below:

Iowa's Largest Cities (population in thousands—1997 estimates):

Ames	52
Ankeny	24
Bettendorf	31
Burlington	25
Cedar Falls	39
Cedar Rapids	96
Clinton	26
Council Bluffs	52
Davenport	92
Des Moines	169
Dubuque	60
Fort Dodge	22
Iowa City	68
Marion	25
Marshalltown	25
Mason City	27
Muscatine	23
Newton	15
Ottumwa	24
Sioux City	75
Urbandale	30
Waterloo	61
West Des Moines	48

50. What kind of distribution is this: bimodal, normal, uniform, or skewed? Why?

51. Where is there a ***cluster***?

52. Describe any ***gaps*** or ***outliers*** in the distribution.

Use the data about Iowa cities on the previous page to answer these questions.

_____53. What is the ***mode***?

_____54. What is the ***median***?

_____55. What is the ***midrange***?

_____56. What is the ***range***?

Here are the number of pages in 7 books: 62, 115, 198, 247, 252, 300, 480

_____57. What is the ***mean*** of the data above?

_____58. What is the ***median*** of the data above?

_____59. What is the ***range*** of the data above?

_____60. What is the ***standard deviation***?

_____61. What is the ***coefficient of variation***?

62. Why is there ***no mode*** for this data?

_____63. Which type of average—***mean***, ***median***, or ***mode***—is most affected by outliers?

_____64. Which type of average—***mean***, ***median***, or ***mode***—can have more than one value for the same set of data?

Answer these multiple choice questions.

_____65. Which type of sample is considered the best for statistical purposes?

A. convenience sample
B. cluster sample
C. stratified sample
D. systematic sample
E. random sample

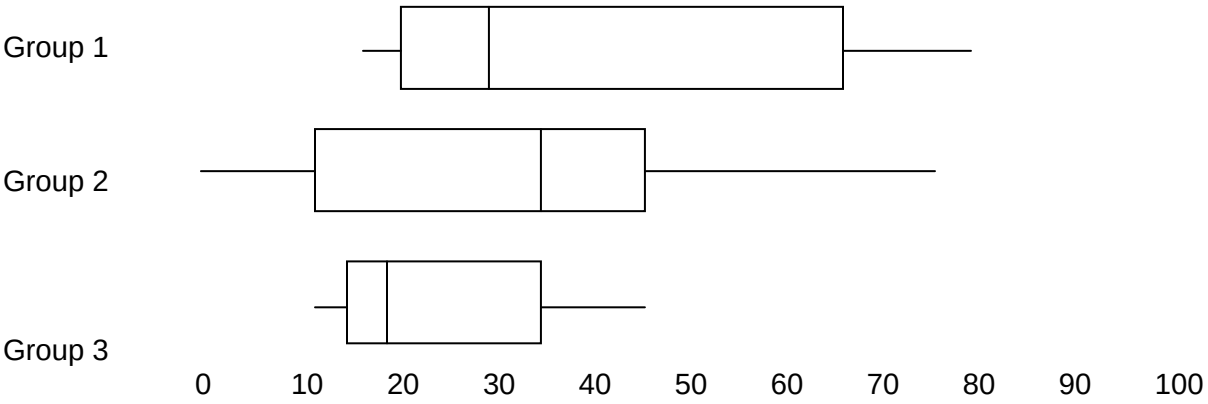
_____66. Which type of distribution is considered the best for statistical purposes?

A. bimodal distribution
B. normal distribution
C. uniform distribution
D. skewed distribution

67. Given these numbers: 18, 19, 19, 36, 52, 75, 84, 93, 100 , find the **five number summary**:

68. Find the **interquartile range** of the numbers in Problem 56.

Using the box and whisker plots below to answer the questions.



_____69. Which group has the lowest median?

_____70. Which group has the highest overall score?

_____71. Which group has the highest median?

_____72. Which group is the most spread out?

_____73. Which group has smallest interquartile range?

Iowa's Largest Cities (Census 2000 – There are 25 cities on the list):

Des Moines	194,000		Bettendorf	32,000
Cedar Rapids	122,000		Marion	30,000
Davenport	98,000		Mason City	28,000
Sioux City	84,000		Clinton	27,000
Waterloo	67,000		Burlington	26,000
Iowa City	63,000		Marshalltown	26,000
Council Bluffs	59,000		Fort Dodge	26,000
Dubuque	57,000		Ottumwa	25,000
Ames	53,000		Muscatine	23,000
West Des Moines	52,000		Coralville	17,000
Cedar Falls	36,000		Newton	16,000
Urbandale	36,000		Clive	14,000
Ankeny	36,000			

_____74. Which is the percentile rank for Mason City (among the cities listed here)?

_____75. What is the percentile rank for Burlington?

_____76. What is the percentile rank for Clive?

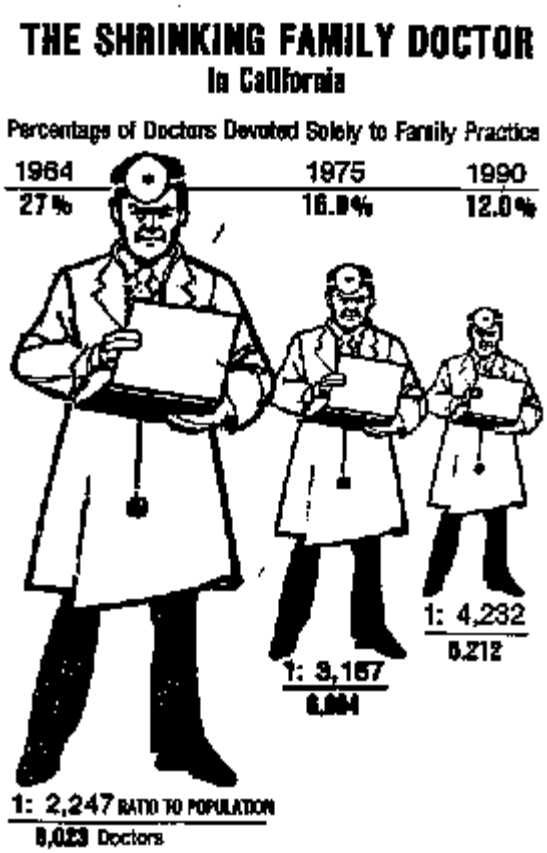
_____77. Which city ranks at the 60^{th} percentile?

_____78. Which city ranks at the 84^{th} percentile?

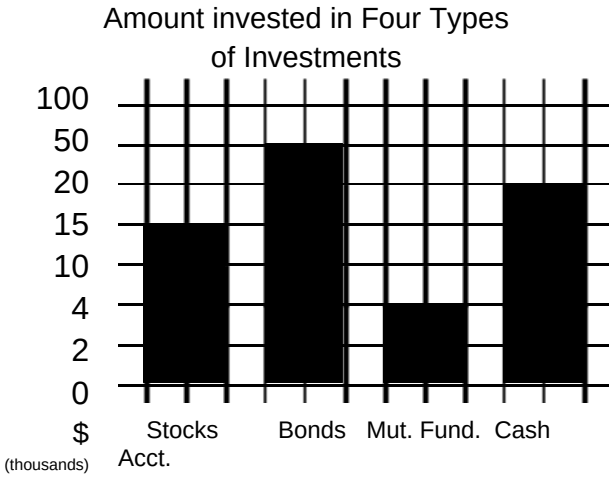
79. Suppose you get the top score on this test. Why would it be impossible for you to rank at the 100th percentile?

Answer the following:

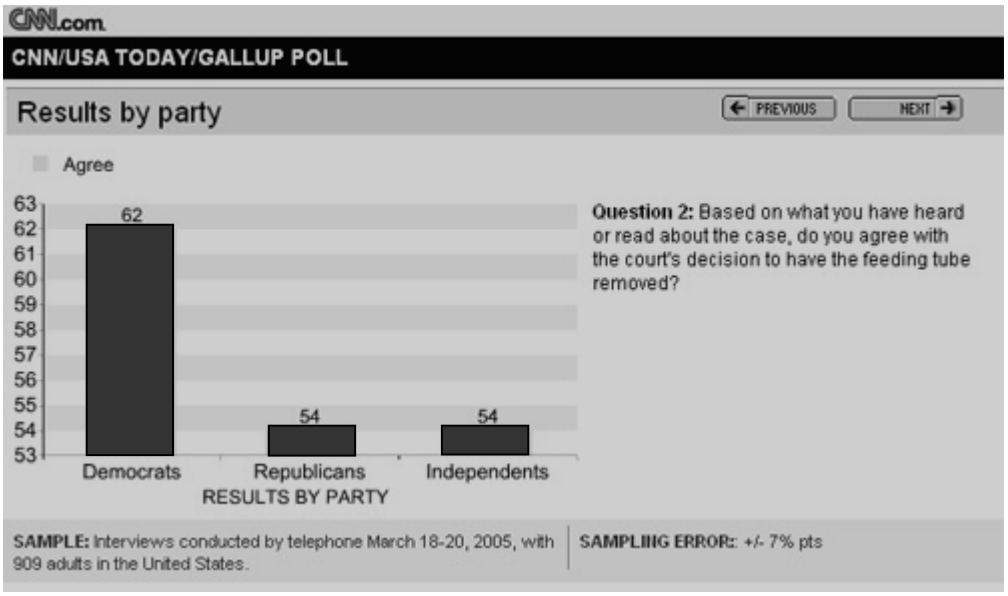
80. What is the main thing that makes this pictograph misleading?



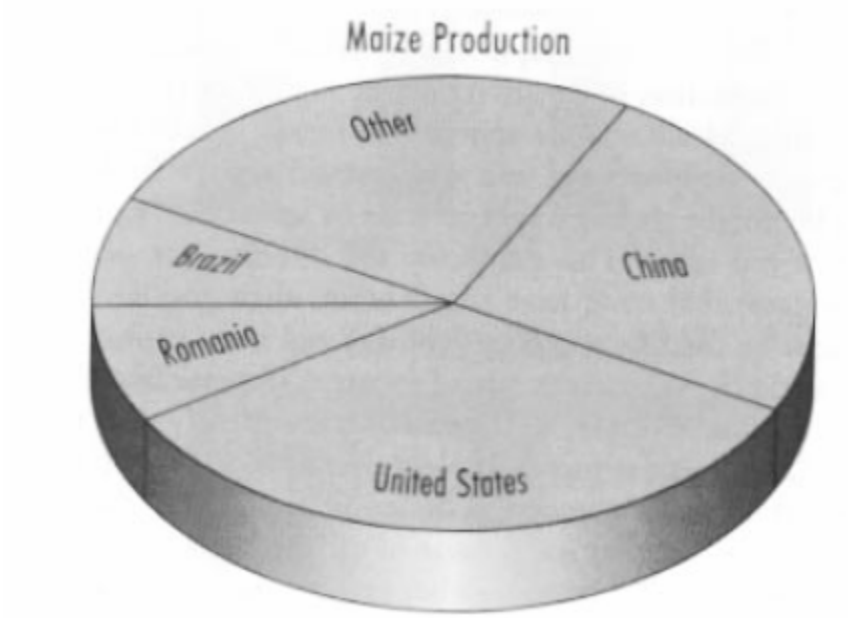
81. What is the main thing that makes this bar graph misleading?



82. What is the main thing that makes this bar graph misleading?



83. Why is the main thing that makes this circle graph misleading?



84. Why would the information at right **not** work well in a **circle graph**?

Percentage of Students Enrolled in Classes

Math Courses	→	22%
Science Courses	→	18%
English Courses	→	37%
Social Studies Courses	→	40%
Business Courses	→	29%
Other Courses	→	35%

Answers

1. 17^{th} and 18^{th} Centuries (1600s – 1700s)
2. help king of France win at cards **OR** predict the weather **OR** find out why people were dying of cholera
3. help factories produce high quality goods cheaply **OR** help insurance industry assess risks **OR** public opinion polls **OR** forensic science **OR** accountability
4. unlikely to happen by chance
5. B
6. D
7. A
8. C
9. E
10. I
11. A
12. F
13. J
14. C
15. D
16. G
17. H
18. J
19. B
20. C
21. I
22. A
23. H
24. D
25. F
26. G
27. E
28. A
29. D
30. B
31. A
32. C
33. B
34. D
35. B
36. C
37. A
38. B
39. A
40. E
41. C
42. D
43. B
44. A
45. D
46. B
47. A
48. C
49. The "stems" are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16 (be sure to include all of them); after each stem you put the leaves … for example, after "2", you put "234455567" to represent all the towns in the 20,000 population range. After "16" you'd put "9" for Des Moines.
50. best answer is probably "skewed", because most of the data is toward the bottom.
51. 20,000s
52. 169,000 (Des Moines) is definitely an outlier, and thee is a gap in the lower 100,000s. You might also say there was a gap in the 80,000s.
53. 25,000 (note this and the following answers are in thousands)
54. 31,000
55. 92,000
56. 154,000
57. 236.2857143 (236.3 is a good answer)
58. 247
59. 480 – 62 = 418
60. 135.6278171 (135.6 is a good answer)
61. 135.6278171 ÷ 236.2857143 * 100 = 57.4% (depending on rounding, answer may vary slightly)
62. nothing repeats
63. mean
64. mode
65. E
66. B
67. Min = 18, Q_1 = 19, Med = 52, Q_3 = 88.5, Max = 100
68. 69.5
69. Group 3
70. Group 1
71. Group 2
72. Group 2
73. Group 3
74. 9 ÷ 25 = .36 … 36^{th} percentile
75. 5 (less) ÷ 25 = .2 … 20^{th} percentile
76. 0 percentile
77. .6*25 = 15, find the 16^{th} from bottom … West Des Moines
78. .84*25 = 21, find 22^{nd} from bottom … Sioux City
79. You can't outscore yourself
80. The **main** problem is that the doctor pictures change both their height and width, instead of just getting taller. (There are numerous other problems, too—such as the doctors not being lined up straight or giving three different sets of information on the same graph.)
81. scale does not count evenly
82. scale doesn't start at 0
83. graph has 3-D appearance, which makes U.S. look too big
84. overlap—don't add up to 100%

Formulas

Mean

- $\frac{\sum x}{n}$

Midrange

- $\frac{Max + Min}{2}$

Range

- $Max - Min$

Coefficient of Variation

- $\frac{s}{\bar{x}} \bullet 100$

Interquartile Range

- $Q_3 - Q_1$

Percentile Rank

- $\frac{\#less}{total\ \#} \bullet 100$