ractice Examination 1

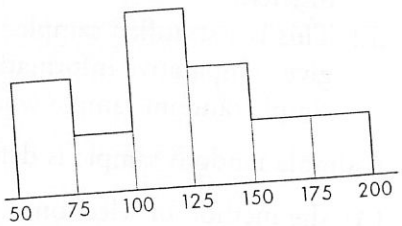
CTION I

uestions 1–40

end 90 minutes on this part of the exam.

Directions: The questions or incomplete statements that follow are each followed by five suggested answers or completions. Choose the response that best answers the question or completes the statement.

1. Following is a histogram of home sale prices (in thousands of dollars) in one community:



Which of the following conclusions is most correct?

(A) The median price was $125,000.
(B) The mean price was $125,000.
(C) More homes sold for between $100,000 and $125,000 than for over $125,000.
(D) $10,000 is a reasonable estimate of the standard deviation in selling prices.
(E) 1.5×10^9 ($\$^2$) is a reasonable estimate of the variance in selling prices.

2. Which of the following is most useful in establishing cause-and-effect relationships?

(A) A complete census
(B) A least squares regression line showing high correlation
(C) A simple random sample (SRS)
(D) A well-designed, well-conducted survey incorporating chance to ensure a representative sample
(E) An experiment

3. The average yearly snowfall in a city is 55 inches. What is the standard deviation if 15% of the years have snowfalls above 60 inches? Assume yearly snowfalls are normally distributed.

(A) 4.83
(B) 5.18
(C) 6.04
(D) 8.93
(E) The standard deviation cannot be computed from the information given.

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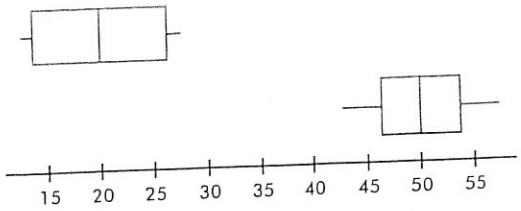
30. Consider the following parallel boxplots indicating the starting salaries (in thousands of dollars) for blue collar and white collar workers at a particular production plant:



Which of the following is a correct conclusion?

(A) The ranges of the distributions are the same.
(B) In each distribution the mean is equal to the median.
(C) Each distribution is symmetric.
(D) Each distribution is roughly normal.
(E) The distributions are outliers of each other.

31. The mean Law School Aptitude Test (LSAT) score for applicants to a particular law school is 650 with a standard deviation of 45. Suppose that only applicants with scores above 700 are considered. What percentage of the applicants considered have scores below 740? (Assume the scores are normally distributed.)

(A) 13.3%
(B) 17.1%
(C) 82.9%
(D) 86.7%
(E) 97.7%

32. If all the other variables remain constant, which of the following will increase the power of a hypothesis test?

I. Increasing the sample size.
II. Increasing the significance level.
III. Increasing the probability of a Type II error.

(A) I only
(B) II only
(C) III only
(D) I and II

33. A researcher planning a survey of school principals in a particular state has lists of the school principals employed in each of the 125 school districts. The procedure is to obtain a random sample of principals from each of the districts rather than grouping all the lists together and obtaining a sample from the entire group. Which of the following is a correct conclusion?

(A) This is a simple random sample obtained in an easier and less costly manner than procedures involving sampling from the entire population of principals.
(B) This is a cluster sample in which the population was divided into heterogeneous groups called clusters.
(C) This is an example of systematic sampling, which gives a reasonable sample as long as the original order of the list is not related to the variables under consideration.
(D) This is an example of proportional sampling based on sizes of the sch districts.
(E) This is a stratified sample, which may give comparative information that a simple random sample wouldn't give.

34. A simple random sample is defined by

(A) the method of selection.
(B) examination of the outcome.
(C) both of the above.
(D) how representative the sample is of the population.
(E) the size of the sample versus the size of the population.

35. Changing from a 90% confidence interval estimate for a population proportion to a 99% confidence interval estimate, with all other things being equal,

(A) increases the interval size by 9%.
(B) decreases the interval size by 9%.
(C) increases the interval size by 57%.
(D) decreases the interval size by 57%.
(E) This question cannot be answere without knowing the sample size.

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Which of the following statements are true?

I. If the right and left sides of a histogram are mirror images of each other, the distribution is symmetric.
II. A distribution spread far to the right side is said to be skewed to the right.
III. If a distribution is skewed to the right, its mean is often greater than its median.

(A) I only
(B) I and II
(C) I and III
(D) II and III
(E) None of the above gives the complete set of true responses.

28. Which of the following statements are true?

I. In a stemplot the number of leaves equals the size of the set of data.
II. Both the dotplot and the stemplot are useful in identifying outliers.
III. Histograms do not retain the identity of individual scores; however, dotplots, stemplots, and boxplots all do.

(A) I and II
(B) I and III
(C) II and III
(D) I, II, and III
(E) None of the above gives the complete set of true responses.

29. The 70 highest dams in the world have an average height of 206 meters with a standard deviation of 35 meters. The Hoover and Grand Coulee dams have heights of 221 and 168 meters, respectively. The Russian dams, the Nurek and Charvak, have heights with z-scores of +2.69 and −1.13, respectively. List the dams in order of ascending size.

(A) Charvak, Grand Coulee, Hoover, Nurek
(B) Charvak, Grand Coulee, Nurek, Hoover
(C) Grand Coulee, Charvak, Hoover, Nurek
(D) Grand Coulee, Charvak, Nurek, Hoover
(E) Grand Coulee, Hoover, Charvak, Nurek

0. The first 115 Kentucky Derby winners by color of horse were as follows: roan, 1; gray, 4; chestnut, 36; bay, 53; dark bay, 17; and black, 4. (You should "bet on the bay!") Which of the following visual displays is most appropriate?

(A) Bar chart
(B) Histogram
(C) Stemplot
(D) Boxplot
(E) Time plot

13. Suppose the average score on a national test is 500 with a standard deviation of 100. If each score is increased by 25%, what are the new mean and standard deviation?

(A) 500, 100
(B) 525, 100
(C) 625, 100
(D) 625, 105
(E) 625, 125

14. If quartiles $Q_1 = 20$ and $Q_3 = 30$, which of the following must be true?

I. The median is 25.
II. The mean is between 20 and 30.
III. The standard deviation is at most 10.

(A) I only
(B) II only
(C) III only
(D) All are true.
(E) None are true.

15. A 1995 poll by the Program for International Policy asked respondents what percentage of the U.S. budget they thought went to foreign aid. The mean response was 18%, and the median was 15%. (The actual amount is less than 1%.) What do these responses indicate about the likely shape of the distribution of all the responses?

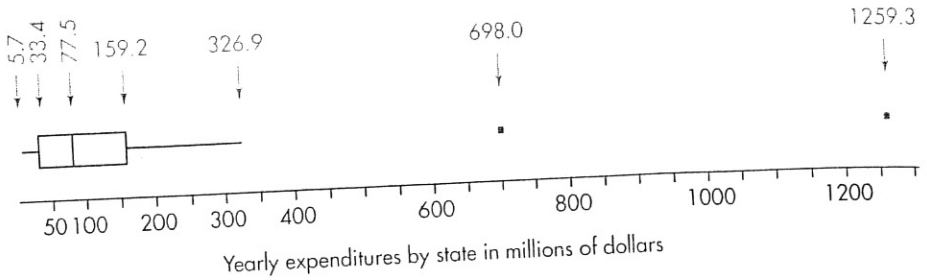
(A) The distribution is skewed to the left.
(B) The distribution is skewed to the right.
(C) The distribution is symmetric around 16.5%.
(D) The distribution is bell-shaped with a standard deviation of 3%.
(E) The distribution is uniform between 15% and 18%.

16. Assuming that batting averages have a bell-shaped distribution, arrange in ascending order:

I. An average with a z-score of -1.
II. An average with a percentile rank of 20%.
III. An average at the first quartile, Q_1.

(A) I, II, III
(B) III, I, II
(C) II, I, III
(D) II, III, I
(E) III, II, I

3. The Children's Health Insurance Program (CHIP) provides health benefits to children from families whose incomes exceed the eligibility for Medicaid. Each state sets its own eligibility criteria. The following boxplot shows recent yearly expenditures on this program by state.



Yearly expenditures by state in millions of dollars

(a) What are the median and interquartile range of the distribution of yearly state expenditures in the CHIP program?

(b) Suppose the federal government takes over three million dollars of administrative costs from the state CHIP expenditures. What are the median and interquartile range of the new reduced expenditure distribution?

(c) Suppose instead the federal government picks up the tab for half of all state CHIP expenditures. What are the median and interquartile range of this new reduced expenditure distribution?

(d) Based on the above boxplot, which of the following is the most reasonable value for the mean state expenditure (in millions of dollars): 78, 135, 325, 630, or 750? Explain.

4. Suppose a distribution has mean 300 and standard deviation 25. If the z-score of Q_1 is –0.7 and the z-score of Q_3 is 0.7, what values would be considered to be outliers?

ee-Reponse Questions

irections: You must show all work and indicate the methods you use. You ll be graded on the correctness of your methods and on the accuracy of your al answers.

ur Open-Ended Questions

Victims spend from 5 to 5840 hours repairing the damage caused by identity theft with a mean of 330 hours and a standard deviation of 245 hours.

(a) What would be the mean, range, standard deviation, and variance for hours spent repairing the damage caused by identity theft if each of the victims spent an additional 10 hours?

(b) What would be the mean, range, standard deviation, and variance for hours spent repairing the damage caused by identity theft if each of the victims' hours spent increased by 10%?

. In a study of all school districts in a state, the median 4-year graduation rate was 78.0% with Q_1 = 60.4% and Q_3 = 82.6%. The only rates below Q_1 or above Q_3 were 26.4%, 32.2%, 49.0%, 57.9%, 88.3%, and 98.1%.

(a) Draw a boxplot.

(b) Describe the distribution.

(c) Is the mean 4-year graduation rate probably close to, below, or above 78.0%? Explain.

(d) Would a stemplot give more, less, or basically the same information?