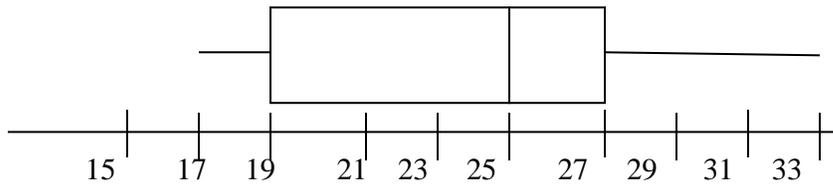


## Study Guide for Multiple Choice Midterm Exam

- The following are prices for a 25 inch T.V. found in different stores around Roseville:  
100,98,121,111,97,135,136,104,135,138,189,114, 92, 69
  - Skewed to the right
  - Symmetric
  - Skewed to the left
  - Uniform
  - Bell shaped
- Which of the following are true statements?
  - Not every symmetric bell shaped curves are normal
  - All normal curves are bell shaped and symmetric
  - All symmetric histograms are unimodal
  - I only
  - II only
  - III only
  - I and II
  - None of the above
- Which of the following are true statements?
  - Stemplots are useful for extremely large data sets.
  - In histograms, relative areas correspond to relative frequencies.
  - Both dotplots and stemplots show symmetry, clusters, gaps, and outliers.
  - I only
  - II only
  - I and II
  - II and III
  - III only
- Which of the following distributions are more likely to be skewed to the left than Skewed to the right.
  - Scores on an easy test
  - Scores on a hard test
  - # of sodas drank in a week
  - I only
  - I and II
  - I and III
  - II and III
  - I, II, and III
- Suppose the average score on a national test is 600, with a standard deviation of 50.  
If each score is increased by 10, what are the new mean and standard deviation.
  - 600, 60
  - 610, 50
  - 610, 55
  - 610, 60
  - 600, 50
  - f.
- When a set of data has suspect outliers, which of the following are preferred measures of central tendency and of variability?
  - mean and variance
  - median and range
  - mean and range
  - median and interquartile range
  - mean and standard deviation

7. Use the following boxplot to answer the following



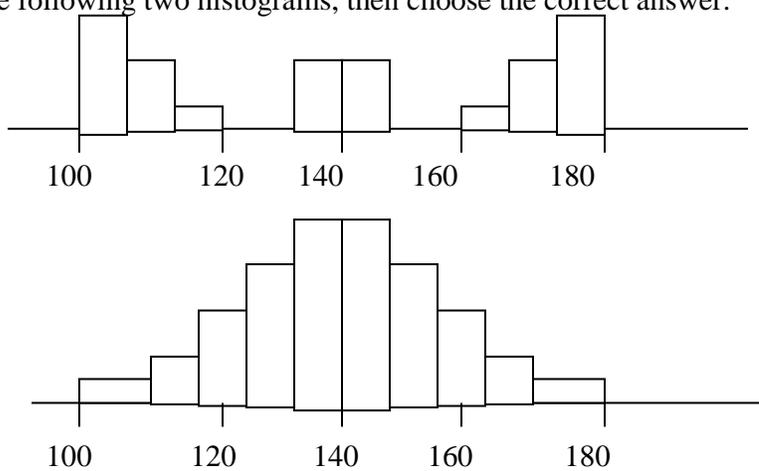
- I. The mean score is 25
  - II. The interquartile range is 8
  - III. The 75<sup>th</sup> percentile rank is 19
- a. I only
  - b. II only
  - c. III only
  - d. II and III
  - e. I and II

8. A student poll here on campus shows 20% like McDonalds, 30% like Burger King, 25 % like Wendy's and 25% like The Habit.

Which of the following visual displays is most appropriate.

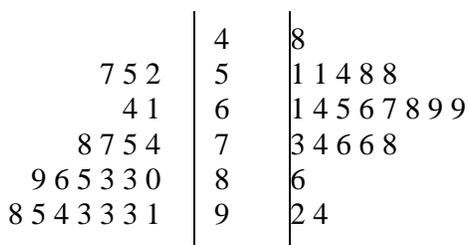
- a. Boxplot
- b. Dotplot
- c. Scatterplot
- d. Bar chart
- e. Stem and leaf plot

9. Consider the following two histograms, then choose the correct answer.



- a. Both sets have the same standard deviation
- b. Both sets have gaps and clusters
- c. Only one of the graphs is symmetric
- d. Both sets have the same mean and same range
- e. Both sets have the same variance

10. Consider the following back to back stem and leaf plot

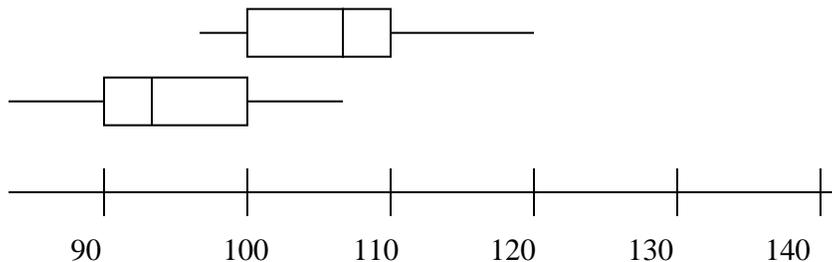


Which of the following is a true statement

- I. The ranges are the same
- II. The variances are the same
- III. The means are the same
- IV. The medians are the same
- V. The sample sizes are the same

- a. I and II
- b. I and V
- c. II and V
- d. III and V
- e. I, II, and III

11. Consider the following parallel boxplots.



- I. They both have the same range
  - II. They both have the same interquartile ranges
  - III. They both have the same mean
  - IV. They both have the same medians
- a. I and IV
  - b. II and IV
  - c. III and IV
  - d. II and III
  - e. I and II

12. Which of the following statements about the correlation coefficient  $r$  are true?

- I. It is not affected by changes in the measurement units of the variables.
- II. It is not affected by which variable is called  $x$  and which is called  $y$ .
- III. It is not affected by extreme values.

- a. I only
- b. I and II
- c. I and III
- d. II and III
- e. I, II, and III

13. Which of the following statements about residuals are true?

- I. Outliers in the  $y$  direction have large residuals.
- II. A definite pattern in the residual plot is an indication that a nonlinear model will show a better fit to the data than a straight regression line.
- III. A residual plot that has no definite pattern indicates that a nonlinear relationship will show a better fit to the data than a straight line.

- a. II only
- b. I and III
- c. II and III
- d. I, II, and III
- e. I and II

14. The heart disease death rates per 100,000 people in the united states for certain years were:

year	1950	1960	1970	1975	1980
Death rate	307.6	286.2	253.6	217.8	202.0

Find the regression line and predict the death rate for the year 1983

- 145.8 per 100,000 people
- 192.5 per 100,000 people
- 196.8 per 100,000 people
- 198.5 per 100,000 people
- None of the above

Questions 15 – 17 are based on the following table which shows the number of high school students taking an AP class in a subject by grade level

	Math	English	Foreign Language
Senior	70	80	70
Junior	150	60	35
Sophomore	180	30	15

15. What Percentage of students are taking Math?

- 10.14%
- 30.43%
- 57.97%
- 88.4%
- None of the above

16. What percentage of the students are juniors and taking a Foreign Language?

- 14.29%
- 17.39%
- 5.07%
- 52.89%
- None of the above

17. What percentage of those taking English are Seniors.

- .4706
- .3636
- .1159
- .3043
- .3188

18. Which of the following are true statements?

- In an experiment some treatment is intentionally forced on one group to note the response.
- In an observational study information is gathered on an already existing situation.
- Sample surveys are observational studies, not experiments.

- I and II
- I and III
- II and III
- I, II, and III
- None of these are true statements.

19. In one study bodybuilders were given 500 and 1,000 milligrams of creatine, and the increase in strength gained in the bench press was noted. In a second study people responded to a questionnaire asking about the average time they spend in the gym in a day and the amount of weight they can bench press.

- Both studies were controlled experiments
- Both studies were observational.
- None of the above is a correct statement.
- The first study was an experiment without a control group, while the second was an observational study.
- The first study was an observational study, while the second was a controlled experiment.

20. Which of the following are true statements?
- I. Based on careful use of control groups, experiments can often indicate cause and effect relationships.
  - II. An observational study may suggest cause and effect if one can control lurking variables.
  - III. A complete census is the only way to establish a cause and effect relationship absolutely.
- a. I, II, and III
  - b. I and II
  - c. I and III
  - d. II and III
  - e. None of the above.
21. Jerry Springer's special show on would you date your own sister asked his viewers "would you date your own sister?" Of more than 10,000 viewers who responded, 70% said yes. What does this show?
- a. The survey would have been more meaningful if he had picked a random sample of the 10,000 viewers.
  - b. The survey would have been more meaningful if he had used a control group.
  - c. This was a legitimate sample, randomly drawn from his viewers and of sufficient size to allow the conclusion that most of his viewers would in fact date their own sister.
  - d. No meaningful conclusion is possible without knowing something more about the characteristics of his viewers.
  - e. The survey is meaningless because of voluntary response.
22. Each of the 7 basketball teams in the SFL has 12 players. A sample of 14 players is to be chosen as follows. Each team will be asked to place 12 cards with their players names into a hat and randomly draw out two names. The two names from each team will be combined to make up the sample. Will this method result in a simple random sample of the 84 basketball players.
- a. Yes, because this is an example of stratified sampling, which is a special case of simple random sampling.
  - b. No, because the teams are not chosen randomly.
  - c. No, because not each group of 14 players has the same chance of being selected.
  - d. Yes, because each player has the same chance of being selected.
  - e. Yes, because each team is equally represented.
23. A researcher planning a survey of heads of households in a particular state has census lists for each of the 23 counties in that state. The procedure will be to obtain a random sample of heads of households from each of the counties rather than grouping all the census lists together and obtaining a sample from the entire group. Which of the following is a true statement about the resulting stratified sample.
- I. It is easier and less costly to obtain than a simple random sample.
  - II. It gives comparative information that a simple random sample wouldn't give.
  - III. It is not a simple random sample.
- a. I and III
  - b. I, II, and III
  - c. I only
  - d. I and II
  - e. None of the above
  - f.
24. In designing an experiment, blocking is used
- a. As a substitute for a control group
  - b. As a first step in randomization
  - c. To control the level of the experiment.
  - d. To reduce bias
  - e. To reduce variation by controlling extraneous factors.

25. Consider the following studies being run by three different nursing homes.
- I. One nursing home brings in pets for an hour every day to see if patient morale is improved.
  - II. One nursing home allows hourly visits every day by kindergarten children to see if patient morale is improved.
  - III. One nursing home administers antidepressants to all patients to see if patient morale is improved.

Which of the following statements are true?

- a. All of the (b-e) are true
  - b. None of these studies uses randomization
  - c. None of these studies uses control groups
  - d. None of these studies uses blinding
  - e. Important information can be obtained from all these studies, but none will be able to establish cause and effect relationships.
26. Which of the following are important in the design of an experiment?
- I. Control of confounding variables
  - II. Randomization in assigning subjects to different treatments.
  - III. Using a single treatment to gain knowledge about the response variable
- a. I only
  - b. II only
  - c. III only
  - d. I, II, and III
  - e. I and II
27. 30% of the students on campus bring their text book to class with them. In a random group of 10 people, what is the probability that exactly six have brought their books to class?
- a. .0367
  - b. .1029
  - c. .2000
  - d. .3503
  - e. .9890
28. One of the lottery tickets that you can purchase at a local store has these payoff probabilities.
- |             |    |     |     |
|-------------|----|-----|-----|
| Payoff (\$) | 0  | 200 | 500 |
| Probability | .5 | .2  | .3  |
- What are the mean and standard deviation for the payoff variable?
- a.  $\mu_x = 233.33$   $\sigma_x = 355.9$
  - b.  $\mu_x = 233.33$   $\sigma_x = 220.85$
  - c.  $\mu_x = 190$   $\sigma_x = 363.13$
  - d.  $\mu_x = 190$   $\sigma_x = 216.56$
  - e. None of the above
29. If  $P(A) = .3$  and  $P(B) = .2$ , what is  $P(A \cup B)$  if A and B are Independent?
- a. .06
  - b. .44
  - c. .50
  - d. .56
  - e. There is insufficient information.
30. There are two games involving flipping a coin. In the first game you win a prize if you can throw between 40% and 60% heads. In the second game you win if you can throw more than 75% heads. For each game would you rather flip the coin 50 or 500 times?

- a. It does not matter.
  - b. 50 times for each game
  - c. 500 for each game
  - d. 50 for the first game and 500 for the second
  - e. 500 for the first game and 50 for the second
31. Given that 55% of the U.S. Population are female and 20% are older than age 65, can we conclude that  $(.55)(.20) = 11\%$  are women older than 65?
- a. yes, by the multiplication rule.
  - b. Yes, by conditional probability
  - c. Yes, by law of large numbers.
  - d. No, because the events are not independent.
  - e. No, because the events are mutually exclusive.
32. Consider the following table of ages of U.S. senators

Age (yrs)	< 40	40 – 49	50 – 59	60 – 69	70 – 79	> 79
Number of senators	10	25	30	29	4	2

What is the probability that a senator is less than 60 years old given that he is over 39 years old?

- a. .055
  - b. .111
  - c. .611
  - d. .90
  - e. .94
33. Given  $P(A) = .3$  and  $P(A \cup B) = .7$ , what is the probability  $P(B)$  if A and B are mutually exclusive? If A and B are independent?
- a. .4, .3
  - b. .4, .57
  - c. None of the answers are correct
  - d. .7, .57
  - e. .7, .3
34. Granite Bay High school receives 15% of its packages from company C1, 45% from company C2, and the rest from company C3. The probability that a package is late is .03, .02, and .04, depending on whether it is from company C1, C2, or C3, respectively. If a randomly chosen package is late, what is the probability that it is from company C1?
- a. .153
  - b. .0045
  - c. .0295
  - d. .016
  - e. .009
35. Which of the following are true statements?
- f. None of the above.
    - I. Normal curves with different means can be centered around the same numbers.
    - II. The area under a normal curve is always equal to one, no matter what the mean and standard deviation are.
    - III. The smaller the standard deviation of a normal curve, the shorter and wider the graph.
  - a. None of the above.
  - b. II only
  - c. II and III
  - d. I and II
  - e. I, II, and III

36. A trucking firm determines that its fleet of trucks averages a mean of 18.2 miles per gallon with a standard deviation of .8 miles per gallon on cross country hauls. What is the probability that one of the trucks averages more than 19 miles per gallon?
- .212
  - .788
  - None of the answers is correct
  - .159
  - .841
  -
37. The mean score on a college entrance exam is 600 with a standard deviation of 50. 80% of the tests takers score above what value?
- 642
  - 558
  - 525
  - 650
  - None of the answers are correct
38. Given that 58% of all gold dealers believe next year will be a good one to speculate in South African gold coins, in a simple random sample of 150 dealers, what is the probability that between 55% and 60% believe that it will be a good year to speculate?
- .4619
  - .0500
  - .1192
  - .3099
  - .9215
39. Assume that a baseball team has an average pitcher, that is one whose probability of winning any decision is .5. If this pitcher has 40 decisions in a season, what is the probability that he will win less than 30 games?
- .9989
  - .9997
  - .002
  - .001
  - .0003
40. The mean income per household in a certain state is \$9000 with a standard deviation of \$1500. The middle 90% of incomes are between what two values.
- \$6060 and \$11940
  - \$6532 and 11467
  - \$7078 and \$8999
  - \$7737.5 and \$10262.4

**Answers:**

- 1)A 2)D 3)D 4)A 5)B 6)D 7)B 8)D 9)D 10)B 11)E 12)B 13)E  
 14)E 15)C 16)C 17)A 18)D 19)D 20)C 21)E 22)C 23)B 24)E 25)A 26)B  
 27)A 28)D 29)B 30)E 31)D 32)C 33)B 34)A 35)B 36)D 37)B  
 38)A 39)A 40)B