1. What do we call a sample that consists of the entire population?

   A) A stratum
   B) A multistage sample
   C) A mistake. A sample can never be the entire population.
   D) A census

2. We say that the design of a study is biased if which of the following is true?

   A) A racial or sexual preference is suspected.
   B) Random placebos have been used.
   C) Certain outcomes are systematically favored.
   D) The correlation is greater than 1 or less than –1.

3. In order to investigate whether women are more likely than men to prefer Democratic candidates, a political scientist selects a large sample of registered voters, both men and women. She asks every voter whether they voted for the Republican or the Democratic candidate in the last election. This is

   A) an observational study.
   B) a multistage sample.
   C) a double-blind experiment.
   D) a block design.
   E) a systematic survey.

4. A television station is interested in predicting whether voters in its viewing area are in favor of federal funding for abortions. It asks its viewers to phone in and indicate whether they support/are in favor of or are opposed to this policy. Of the 2241 viewers who phoned in, 1574 (70.24%) were opposed to federal funding for abortions. The viewers who phoned in are

   A) a voluntary response sample.
   B) a convenience sample.
   C) a probability sample.
   D) a population.
   E) a simple random sample.

5. We wish to draw a sample of size 5 without replacement from a population of 50 households. Suppose the households are numbered 01, 02, . . . , 50, and suppose that the relevant line of the random number table is 11362 35692 96237 90842 46843 62719 64049 17823.
   Then the households selected are

   A) households 11 13 36 62 73
   B) households 11 36 23 08 42
   C) households 11 36 23 23 08
   D) households 11 36 23 56 92
   E) households 11 35 96 90 46

Use the following to answer questions 6 and 7:

One hundred volunteers who suffer from severe depression are available for a study. Fifty are selected at random and are given a new drug that is thought to be particularly effective in treating severe depression. The other 50 are given an existing drug for treating severe depression. A psychiatrist evaluates the symptoms of all volunteers after four weeks in order to determine if there has been substantial improvement in the severity of the depression.

6. The study described above would be double-blind if

   A) neither drug had any identifying marks on it.
   B) all volunteers were not allowed to see the psychiatrist nor the psychiatrist allowed to see the volunteers during the session in which the psychiatrist evaluated the severity of the depression.
   C) neither the volunteers nor the psychiatrist knew which treatment any person had received.
   D) the psychiatrist didn't tell the volunteers which drug they were receiving.
   E) all of the above.

7. Referring to the study described above, suppose volunteers were first divided into groups of men and women, and then half of the men were randomly assigned to the new drug and half of the women were assigned to the new drug. The remaining volunteers received the other drug. This would be an example of

   A) replication.
   B) confounding. The effects of gender will be mixed up with the effects of the drugs.
   C) a block design.
   D) a matched-pairs design.
   E) a stratified design.

8. At the beginning of the school year, a high-school teacher asks every student in her classes to fill out a survey that asks for their age, the number of years they have lived at their current address, their favorite school subject, and whether they plan to go to college after high school. Whish of the following best describes the variables that are being measured?

   A) Four quantitative variables.
   B) Five quantitative variables.
   C) Two categorical variables and two quantitative variables.
   D) Two categorical variables and three quantitative variables.
   E) Three categorical variables and two quantitative variables.

9. The median of a data set is always/sometimes/never (select one) one of the data points in a set of data.

   A) always
   B) never
   C) sometimes

10. Of the following measures: mean, median, IQR, and standard deviation, which are *resistant*?

   A) mean and median
   B) median and IQR
   C) mean and standard deviation
   D) median and standard deviation
   E) none of the above

11. A set of data has a median that is much larger than the mean. Which of the following statements is most consistent with this information?

   A) A stem plot of the data is asymmetrical.
   B) A stem plot of the data is skewed left.
   C) A stem plot of the data is skewed right.
   D) The data set must be so large that it would be better to draw a histogram than a stemplot.
   E) A stem plot of the data is symmetric.

12. If a distribution is skewed to the right, which of the following is true?

   A) The mean must be less than the median.
   B) The mean and the median must be equal.
   C) The mean must be greater than the median.
   D) The mean is either equal to or less than the median.
   E) It is impossible to tell which of the above statements is true without seeing the data.

13. A Normal density curve has which of the following properties?

   A) It is symmetric.
   B) The median is equal to the mean.
   C) The spread of the curve is proportional to the standard deviation.
   D) It has a peak centered above its mean.
   E) All of the above.

Use the following information for questions 14 and 15.

The distribution of actual weights of 8.0-ounce chocolate bars produced by a certain machine is normal with a mean of 8.1 ounces and a standard deviation of 0.1 ounces.

14. The proportion of chocolate bars weighing less than 8.0 ounces is

   A) 0.159.   B) 0.341.   C) 0.500.   D) 0.659.   E) 0.841.

15. The proportion of chocolate bars weighing between 8.2 and 8.3 ounces is

   A) 0.819.   B) 0.636.   C) 0.477.   D) 0.136.   E) 0.022.

16. The time taken to prepare the envelopes to mail a weekly report to all executives in a company has a normal distribution with a mean of 35 minutes and a standard deviation of 2 minutes. On 95% of all occasions, the mailing preparation takes less than

    A) 31.71 minutes.
    B) 34.75 minutes.
    C) 35.25 minutes.
    D) 36.90 minutes.
    E) 38.29 minutes.

17. If $P(A) = 0.24$ and $P(B) = 0.52$ and A and B are independent, what is $P(A$ or $B)$?

    A) 0.1248   B) 0.28.   C) 0.6352.   D) 0.76.   E) the answer cannot be determined.

18. Which of the following pairs of events are disjoint (mutually exclusive)?

    A)   A: the odd numbers.; B: the number 5
    B)   A: the even numbers; B: the numbers greater than 10
    C)   A: the numbers less than 5; B: all negative numbers
    D)   A: the numbers above 100; B: the numbers less than -200
    E)   A: negative numbers; B: odd numbers

19. If A U B = S (sample space), P(A and B^c) = 0.25, and P(A^c) = 0.35, then P(B) =

    A) 0.35.   B) 0.4.   C) 0.65.   D) 0.75.   E) none of these.

20. If you buy one ticket in the Provincial Lottery, then the probability that you will win a prize is 0.11. If you buy one ticket a month for five months, what is the probability that you will win at least one prize?

    A) 0.55.   B) 0.50.   C) 0.44.   D) 0.45.   E) 0.56.

21. In a large population of college students, 20% of the students have experience feelings of math anxiety. If you take a random sample of 10 students from this population, the probability that exactly 2 students have experienced math anxiety is

    A) .3020.   B) .2634.   C) .2013.   D) .5.   E) 1.

22. A random variable X has mean μ_X and standard deviation σ_X. Suppose n independent observations of X are taken and the average $\bar{x}$ of these n observations is computed. We can assert that if n is very large, the sampling distribution of $\bar{x}$ is approximately normal. This assertion follows from:

    A)   the law of large numbers.
    B)   the central limit theorem.
    C)   the definition of a sampling distribution.
    D)   the bell curve.
    E)   the standard deviation of the sampling distribution.

23. A multiple-choice exam has 100 questions, each with five possible answers. If a student is just guessing at all the answers, the probability that he or she will get more than 30 correct is

A) 0.2500.   B) 0.1230.   C) 0.1056.   D) 0.0061.   E) 0.0400.

Use the following to answer questions 24 and 25:

The distribution of actual weights of 8-ounce chocolate bars produced by a certain machine is normal with mean 8.1 ounces and standard deviation 0.1 ounces.

24. If a sample of five of these chocolate bars is selected, the probability that their average weight is less than 8 ounces is

A) 0.0125.   B) 0.1853.   C) 0.2389.   D) 0.4871.   E) 0.9873.

25. If a sample of five of these chocolate bars is selected, there is only a 5% chance that their average weight will be below

A) 7.94 ounces.   B) 8.03 ounces.   C) 8.08 ounces.   D) 8.17 ounces.   E) 8.20 ounces.

26. You have measured the systolic blood pressure of a random sample of 25 employees of a company located near you. A 95% confidence interval for the mean systolic blood pressure for the employees of this company is (122, 138). Which of the following statements gives a valid interpretation of this interval?

A)   Ninety-five percent of the sample of employees have a systolic blood pressure between 122 and 138.
B)   Ninety-five percent of the population employees have a systolic blood pressure between 122 and 138.
C)   The probability that the population mean blood pressure is between 122 and 138 is 0.95.
D)   If the procedure were repeated many time, 95% of the resulting confidence intervals would contain the population mean systolic blood pressure.
E)   If the procedure were repeated many times, 95% of the sample means would be between 122 and 138.

27. A polling organization announces that the proportion of American voters who favor congressional term limits is 64%, with a 95% confidence margin of error of 3%. If the opinion poll had announced the margin of error for 80% confidence rather than 95% confidence, this margin of error would be

A)   3%, because the same sample is used.
B)   less than 3%, because we require less confidence.
C)   less than 3%, because the sample size is smaller.
D)   greater than 3%, because we require less confidence.
E)   greater than 3%, because the sample size is smaller.

28. In formulating hypotheses for a statistical test of significance, the null hypothesis is often

  A) a statement that there is "no effect" or "no difference."

  B) proven correct.

  C) a statement that the data are all 0.

  D) 0.05.

  E) the probability of observing the data you actually obtained.

29. In testing hypotheses, which of the following would be strong evidence against the null hypothesis?

  A) Obtaining data with a small *P*-value.

  B) Using a small level of significance.

  C) Obtaining data with a large *P*-value.

  D) Using a small level of significance.

  E) Obtaining data with a small sample standard deviation.

30. An opinion poll asks a simple random sample of 100 college seniors how they view their job prospects. In all, 53 say "good." Does the poll give convincing evidence to conclude that more than half of all seniors think their job prospects are good? If p = the proportion of all college seniors who say their job prospects are good, what are the hypotheses for a test to answer this question?

  A) $H_0 : p = 0.5; H_a : p > 0.5$

  B) $H_0 : p > 0.5; H_a : p = 0.5$

  C) $H_0 : p = 0.5; H_a : p \neq 0$

  D) $H_0 : p = 0.5; H_a : p < 0.5$

  E) $H_0 : p \neq 0.5; H_a : p > 0.5$

31. An appropriate 95% confidence interval for μ has been calculated as (-0.73, 1.92) based on n = 15 observations from a population with a Normal distribution. If we wish to use this confidence interval to test the hypothesis H_0: μ = 0 against H_a: μ ≠ 0, which of the following is a legitimate conclusion?

  A) Reject H_0 at the α = 0.05 level of significance.

  B) Fail to reject H_0 at the α = 0.05 level of significance.

  C) Reject H_0 at the α = 0.10 level of significance.

  D) Fail to reject H_0 at the α = 0.10 level of significance.

  E) We cannot perform the required test since we do not know the value of the test statistic.

KCATM PROBABILITY AND STATATICS 12 ANSWER KEY 2014

1. D
2. C
3. A
4. A
5. B
6. C
7. C
8. C
9. C
10. B
11. B
12. C
13. E
14. A
15. D
16. E
17. C
18. D
19. D
20. D
21. A
22. B
23. D
24. A
25. B
26. D
27. B
28. A
29. A
30. A
31. B