Name_____Course Number:_____ Section Number:_____

Directions: Answer the questions in the spaces provided, or attach paper. Circle the correct choice for each response set.

Provide an appropriate response.

1) A hip hop radio show broadcast in the city of Puddelton asked people to call in and express their opinions on the new mayor. Are the results likely to be representative of all adults in Puddelton? Of all listeners to the hip hop show? Why or why not?

Use common sense to determine whether the given event is impossible; possible, but very unlikely; or possible and likely.

2) When Dave picked two marbles from a bag containing one red, one blue, and one yellow marble, he got two marbles of the same color. (Assume that he didn't replace the first marble before picking the second).

   A) Possible and likely

   B) Impossible

   C) Possible, but very unlikely

Provide an appropriate response.

3) The table shows the weights (in pounds) and monthly incomes (in dollars) of nine randomly selected women between the ages of 18 and 65. Assume that the x–values are the weights and the y–values are the monthly incomes.

Weight (lb)	113	132	155	122	166	140	118	129	185
Monthly Income (dollars)	1420	3650	5475	2310	4710	2910	1720	2460	4115

Are the x–values matched with the corresponding y–values? That is, is each x–value associated with the corresponding y–value in some meaningful way? If the x– and y–values are matched, does it make sense to use the difference between each x–value and the y–value that is in the same column? Why or why not?

Form a conclusion about statistical significance. Do not make any formal calculations. Either use the results provided or make subjective judgments about the results.

4) In a random sample of 160 women, 78% favored stricter gun control laws. In a random sample of 220 men, 61% favored stricter gun control laws. Is there statistically significant evidence that a larger proportion of women than men favor stricter gun control laws?

Determine whether the given value is a statistic or a parameter.

  5) A health and fitness club surveys 40 randomly selected members and found that the average weight of those questioned is 157 lb.

     A) Statistic   B) Parameter

Determine whether the given value is from a discrete or continuous data set.

  6) The height of 2–year–old maple tree is 28.3 ft.

     A) Discrete   B) Continuous

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

  7) Nationalities of survey respondents.

     A) Ratio   B) Interval   C) Ordinal   D) Nominal

  8) Student's grades, A, B, or C, on a test.

     A) Ratio   B) Ordinal   C) Nominal   D) Interval

Identify the sample and population. Also, determine whether the sample is likely to be representative of the population.

  9) In a poll of 50,000 randomly selected college students, 74% answered "yes" when asked "Do you have a television in your dorm room?".

Use critical thinking to develop an alternative conclusion.

  10) A study of achievement scores by sixth–grade students on a standardized math test showed the three top scorers were all gifted piano players. Conclusion: Playing the piano leads to mathematical achievement.

Use critical thinking to address the key issue.

  11) A company accused of downsizing workers defended itself with the following statement: "Yes, we were forced to lay off 20% of our workforce last year, but this year we increased our workforce by 20%, and we therefore now have the same number of employees as before the layoff." What is the flaw in this argument?

Perform the requested conversions. Round decimals to the nearest thousandth and percents to the nearest tenth of a percent, if necessary.

12) Convert 50% to an equivalent fraction and decimal.

   A) $\frac{1}{3}$, 5   B) $\frac{1}{2}$, 0.5   C) $\frac{1}{3}$, 0.5   D) $\frac{1}{2}$, 5

Solve the problem.

13) Alex and Juana went on a 30–mile canoe trip with their class. On the first day they traveled 12 miles. What percent of the total distance did they canoe?

   A) 0.4%   B) 300%   C) 3%   D) 40%

Provide an appropriate response.

14) A bus company claims that in the past year it has reduced the number of late departures of buses by 100%. What is wrong with this statement?

Determine whether the given description corresponds to an observational study or an experiment.

15) A sample of fish is taken from a lake to measure the effect of pollution from a nearby factory on the fish.

   A) Observational study   B) Experiment

16) A doctor performs several diagnostic tests to determine the reason for a patient's illness.

   A) Experiment   B) Observational study

Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

17) An education researcher randomly selects 48 middle schools and interviews all the teachers at each school.

   A) Random

   B) Cluster

   C) Convenience

   D) Systematic

   E) Stratified

Provide an appropriate response.

18) A researcher obtains an alphabetical list of the 2560 students at a college. She uses a random number generator to obtain 50 numbers between 1 and 2560. She chooses the 50 students corresponding to those numbers. Does this sampling plan result in a random sample? Simple random sample? Explain.

   A) Yes; no. The sample is random because all students have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample containing the first 50 students on the list.

   B) Yes; yes. The sample is random because all students have the same chance of being selected. It is a simple random sample because all samples of 50 students have the same chance of being selected.

   C) No; no. The sample is not random because not all students have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample containing the the first 50 students on the list.

   D) No; yes. The sample is not random because not all students have the same chance of being selected. It is a simple random sample because all samples of 50 students have the same chance of being selected.

Identify the type of observational study (cross-sectional, retrospective, prospective).

19) A researcher plans to obtain data by following those in cancer remission since January of 2005.

   A) Prospective   B) Cross-sectional

   C) Retrospective   D) None of these

Provide an appropriate response.

20) Researchers at a major pharmaceutical company have designed an experiment to test whether a new pill for the common cold will be effective during the "cold season" from mid-December to mid-March. They package the medication in a large box containing 90 pills in individual slots. They also package look-alike pills in the same kind of packing. They commission two nurses to administer the pills to participants who are randomly assigned to the experimental group getting the cold pill and the other group getting the placebo. The nurses do not know whether they are giving their group the cold pill or the placebo. The objective of the experiment is to see whether the group using the cold pill has fewer colds than the group receiving the placebo. Each participant must keep a diary recording when they took their daily pill and the number of colds they had during the trial period. What type of experiment is this? Identify one advantage. Identify one disadvantage.

1) No. A hip hop show is likely to attract a younger audience. Listeners to the show will not be representative of all adults in Puddleton so a sample from those listeners, however well selected, will not be representative. No, this sample will not be representative of all listeners to the show because it is a voluntary response sample – listeners themselves choose whether to respond. Those with stronger opinions are more likely to respond so the sample is unlikely to be representative of all listeners to the show.
2) B
3) The x-values are matched with the y-values. It does not make sense to use the difference between each x-value and the y-value that is in the same column. The x-values are weights (in pounds) and the y-values are monthly incomes (in dollars), so the differences are meaningless.
4) Yes. In these samples, the proportion of women favoring stricter gun control is substantially higher than the proportion of men favoring stricter gun control. If the true proportions were actually equal, there would be a very small likelihood of seeing such a large difference in the samples..
5) A
6) B
7) D
8) B
9) Sample: the 50,000 selected college students; population: all college students; representative
10) A sample of 3 among many students is not sufficient to conclude that playing the piano is conducive to math achievement. Student motivation and interest in math should be considered as factors.
11) Answers will vary. Possible answer: This is a misleading use of percentages, as 20% of the reduced workforce is smaller than 20% of the original workforce. The company therefore did not hire as many new workers as it originally laid off. The size of the current workforce is therefore smaller than the size of the workforce before the layoffs.
12) B
13) D
14) A reduction of 100% would mean that the company had reduced the number of late departures to zero which is not plausible.
15) A
16) A
17) B
18) B
19) A
20) This is a double-blind experiment, since the nurses do not know whether they have administered the cold pill or the placebo, and the participants do not know whether they have the cold pill or the placebo. An advantage is that the researchers will collect results that are not contaminated by participants' reports influenced by knowing which group they are in. A disadvantage is that the experiment is being tracked over a long period of time. Some participants may not have taken their daily pill faithfully every day during the tracking period. True results could thereby be compromised.