

# Multiple Choice Practice Questions

Answer these multiple choice question on your answer sheet.

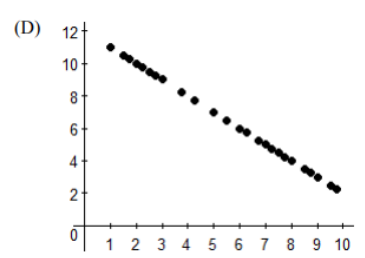
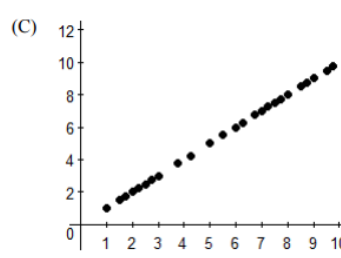
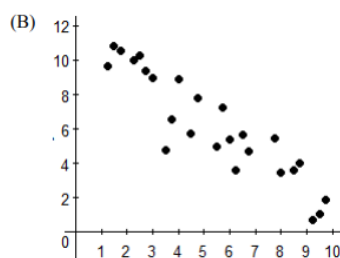
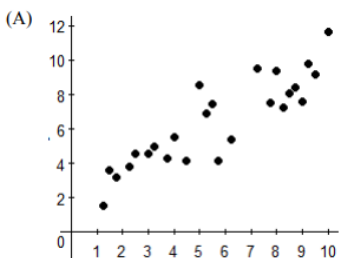
1. The U.S. Census Bureau's 2013 American Community Survey (ACS) estimates that the proportion of Americans between the ages of 18 and 24 who have not received a high school diploma (or equivalent) is 0.1467. Wilmington, NC (population 112,067) is conducting a study in 2015 to see if their proportion is significantly different from the 2013 national proportion. Eight hundred residents between the ages of 18 and 24 were selected at random and it was found that 97 of them had not received a high school diploma or equivalent. What is the problem unit in this situation?

- (A) Americans between the ages of 18 and 24 in 2013.
- (B) The 112,067 residents of Wilmington, NC in 2015.
- (C) The residents of Wilmington, NC between the ages of 18 and 24 in 2015.
- (D) The 800 randomly selected residents of Wilmington, NC in 2015.
- (E) The 112,067 residents of Wilmington, NC in 2013.

2. The dining and nutrition staff at the University of Georgia plans to survey students to get their opinion on the new nutrition program introduced this semester at each of the on-campus dining halls. They are interested in getting feedback from students living both on-campus and off-campus about the new gluten-free and vegetarian options offered at each meal. Which of the following sampling methods is the most appropriate for accomplishing this?

- (A) Hand out a survey to every 10th student that enters each dining hall on a specified day.
- (B) Group students by housing status, one group representing those living on campus and the other representing those living off campus. Email a survey to 100 randomly selected students from each group.
- (C) On equally sized slips of paper, write down the names of all the dormitories on campus as well as all the apartment complexes off campus. Put all the names in a hat, mix them well, and draw out five of them. Email a survey to all students in the five randomly selected buildings.
- (D) Hand out a survey to the first 50 students that enter each dining hall on a specified day.
- (E) Create a Facebook page for each dining hall where students can post their comments

3. Which of the following scatterplots could represent a data set with a correlation coefficient of  $r = 0.85$ ?



4. There is a positive association between the number of drownings and ice cream sales. This is an example of:
- (A) correlation
  - (B) cause and effect relationship
  - (C) descriptive study
  - (D) induction
  - (E) none of the above
5. An experiment was designed an experiment to investigate the effect of the amount of water and seed variety upon subsequent growth of plants. Each plant was potted in a clay plot, and a measured amount of water was given weekly. The height of the plant at the end of the experiment was measured. Which of the following is not correct?
- (A) The dependent variable is the plant height.
  - (B) The independent variables are the amount of water and seed variety.
  - (C) Randomization was used to eliminate the effect of other possible factors upon the growth of the plants.
  - (D) A possible uncontrollable factor in this experiment is any nutrients that might be present in the clay pots.
  - (E) Experiments give the best evidence of "cause-and-effect" relationships.
6. A university statistics professor wants to know if including review problems in each set of homework problems (treatment I) is more effective than including only new problems (treatment II). He teaches three sections of the course: a morning, an afternoon, and an evening section, each with 30 students. Within each section the professor randomly assigns 15 students to treatment I and 15 students to treatment II. Compared to randomly assigning 45 students to each treatment, what is the advantage of randomly assigning 15 students to each treatment within each section?
- (A) Random assignment within section eliminates the placebo effect.
  - (B) Random assignment within section allows the professor to generalize the results to all sections.
  - (C) Random assignment within section permits the professor and students to be blinded as to the treatment group assignment.
  - (D) Random assignment within section accounts for possible differences in performance due to the time of day the class meets.
  - (E) Random assignment within section reduces the effect of nonresponse bias.
7. Nearly 12,000 high school students across 11 different countries were surveyed about both their sleeping habits and their performance in school. Based on the results, researchers concluded that a lack of sleep is linked to students earning poor grades in school. Which of the following statements is true?
- (A) This is a descriptive study. Therefore, researchers cannot conclude that a lack of sleep causes poor grades.
  - (B) This is a descriptive study. Therefore, researchers can conclude that a lack of sleep causes poor grades.
  - (C) This study is a well-designed causal experiment. Therefore, researchers cannot conclude that a lack of sleep causes poor grades.
  - (D) This study is a well-designed causal experiment. Therefore, researchers can conclude that a lack of sleep causes poor grades.
  - (E) This is neither a descriptive study nor a well-designed causal experiment.

8. The American Academy of Pediatrics advises against feeding babies solid foods before they reach 4 months old. A research group obtains a simple random sample of 5,000 mothers nationwide and mails each one a survey asking questions about their feeding practices. Of the 1,000 mothers who completed the survey and mailed it back, 40% indicated that they started feeding their baby solid foods before age 4 months. A newspaper reports on the study with the headline, "Infants are Fed Solid Foods Too Soon." Which of the following is the most serious concern regarding this study?

- (A) There was no control group.
- (B) There could be serious non-response bias.
- (C) The sample size was too small.
- (D) There was no random assignment.
- (E) The sampling design did not incorporate stratification.

9. A volunteer for a mayoral candidate's campaign periodically conducts polls to estimate the proportion of people in the city who are planning to vote for this candidate in the upcoming election. Two weeks before the election, the volunteer plans to double the sample size in the polls. The main purpose of this is to:

- (A) Reduce non-response bias
- (B) Reduce the effects of spuriousness
- (C) Reduce the bias due to the Hawthorne effect
- (D) Decrease the variability in the population
- (E) Decrease the deviation between the plan and problem unit

10. A study of existing records of 27,000 automobile accidents involving children in Michigan found that about 10% of children who were wearing a seatbelt (group SB) were injured and that about 15% of children who were not wearing a seatbelt (group NSB) were injured. Which of the following statements should NOT be included in a summary report about this study?

- (A) Driver behaviour may be another factor.
- (B) The child's location in the car may be another factor.
- (C) This study was not causal; cause-and-effect inferences are not warranted.
- (D) The study demonstrates clearly that seat belts save children from injury.
- (E) Concluding that seatbelts save children from injury is risky, at least until the study is independently replicated.

11. Each of 100 laboratory rats has available both plain water and a mixture of water and caffeine in their cages. After 24 hours, two variables were recorded for each rat: the amount of caffeine the rat consumed, X, and the rat's blood pressure, Y. The correlation co-efficient between X and Y was 0.428. Which of the following conclusions is justified on the basis of this study?

- (A) The correlation co-efficient between X and Y in the population of rats is also 0.428
- (B) If rats stop drinking the water/caffeine mixture, this would cause a reduction in their blood pressure.
- (C) About 18 percent of the variation in blood pressure can be explained by a linear relationship between blood pressure and the caffeine consumed.
- (D) Rats with lower blood pressure do not like the water/caffeine mixture as much as rats with higher blood pressure.
- (E) Since the correlation is not very high, the relationship between the amount of caffeine consumed and blood pressure is not linear.

12. Which set of data could be used to plot a line of best fit?

