Chapter 4 Practice Test

A review of voter registration records in a small town yielded the following table of the number of males and females registered as Democrat, Republican, or some other affiliation.

Male Female

Democrat 300 600

Republican 500 300

Other 200 100

**1.** The proportion of males that are registered as Democrats is

(a) 300. (b) 0.33. (c) 0.30. (d) 0.15. (e) 0.375.

**2.** The proportion of all voters who are male and registered as Democrats is

(a) 300. (b) 0.33. (c) 0.30. (d) 0.15. (e) 0.375.

**3.** Recent data show that states that spend an above-average amount of money *X* per pupil in high school tend to have below-average mean Verbal SAT scores *Y* of all students taking the SAT in the state. In other words, there is a negative association between *X* and *Y*. This is particularly true in states that have a large percent of all high school students taking the exam. Such states also tend to have larger populations. The most plausible explanation for this association is

(a) X causes *Y*. Overspending generally leads to extra, unnecessary programs, diverting attention from basic subjects. Inadequate training in these subjects generally leads to lower SAT scores.

(b) *Y* causes *X*. Low SAT scores creates concerns about the quality of education. This inevitably leads to additional spending to help solve the problem.

(c) changes in *X* and *Y* are due to a common response to other variables. If a higher percent of students take the exam, the average score will be lower. Also, states with larger populations have large urban areas where the cost of living is higher and more money is needed for expenses.

(d) changes in *X* and *Y* are due to confounding with a third variable. As an example, states in which more money is spent on education tend to be those states with more students living in poverty. As a result, it’s the students’ living conditions that lead to lower SAT Verbal scores, and not the amount spent per pupil.

(e) the association between *X* and *Y* is purely coincidental.

**4.** The following two-way table categorizes suicides committed in a particular year by the sex of the victim and the method used.

Method Male Female

Firearms 13,959 2,641

Poison 3,148 2,469

Hanging 3,222 709

Other 1,457 690

Which of the following statements is consistent with the table?

(a) There is absolutely no evidence of a relation between the sex of the victim and the method of suicide used.

(b) More women commit suicide than men.

(c) Men display a greater tendency to use firearms to commit suicide than do women.

(d) The correlation between method of suicide and sex of the victim is clearly positive.

(e) Females prefer poison over any other method of committing suicide.

**5.** A variable grows exponentially over time if

(a) it increases by the addition of a fixed amount to the variable as time increases by a fixed amount.

(b) it increases by squaring its value whenever time is increased by a certain fixed amount.

(c) it increases by multiplication by a fixed amount as time increases by a fixed amount.

(d) it increases by the logarithm of its value whenever time is increased by a certain fixed amount.

(e) none of these.

An article in the student newspaper of a large university had the headline “A's swapped for evaluations?” The article included the following.

According to a new study, teachers may be more inclined to give higher grades to students, hoping to gain favor with the university administrators who grant tenure. The study examined the average grade and teaching evaluation in a large number of courses in order to investigate the effects of grade inflation on evaluations. “I am concerned with student evaluations because instruction has become a popularity contest for some teachers,” said Professor Smith, who recently completed the study.

Results showed that higher grades directly corresponded to a more positive evaluation.

**6.** Which of the following would be a valid conclusion to draw from the study?

(a) A teacher can improve his or her teaching evaluations by giving good grades.

(b) A good teacher, as measured by teaching evaluations, helps students learn better, resulting in higher grades.

(c) Teachers of courses in which the mean grade is above average apparently tend to have above-average teaching evaluations.

(d) Teaching evaluations should be conducted before grades are awarded.

(e) All of the above.

**7.** A business school conducted a survey of companies in its state. They mailed a questionnaire to 200 small companies, 200 medium-sized companies, and 200 large companies. The rate of nonresponse is important in deciding how reliable survey results are. Here are the data on response to this survey:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Small | Medium | Large |
| Response | 125 | 81 | 40 |
| No response | 75 | 119 | 160 |
| Total | 200 | 200 | 200 |

(a) What was the overall response rate?

(b) Calculate appropriate conditional distributions (in percents) to show how nonresponse is related to the size of the business.

(c) Draw a bar graph to compare the nonresponse percents for the three sizes of companies.

(d) Use your work in (b) and (c) to describe how nonresponse is related to the size of the business.

**8.** A company tests two treatments for an illness. The following table shows outcomes by treatment for each trial.

Trial 1 Trial 2

Treatment A Treatment B Treatment A Treatment B

Cases 200 200 Cases 100 400

Cured 40 30 Cured 85 300

(a) Calculate the percent of cases that are cured in Trial 1 for each treatment. Then do likewise for Trial 2

(b) Use the tables above to create a two-way table that shows the relationship between treatment used and treatment outcome.

(c) Calculate the percent of cases that are cured with each treatment.

(d) Explain your findings in (a) and (c).

**9.** This dataset contains the global estimate of cumulative HIV cases worldwide.

|  |  |
| --- | --- |
| Years since  1980 | HIV infection  (millions) |
| 8 | 8.7 |
| 9 | 10.7 |
| 10 | 13.0 |
| 11 | 15.5 |
| 12 | 18.5 |
| 13 | 21.9 |
| 14 | 25.9 |
| 15 | 30.6 |
| 16 | 36.2 |

**a.** How well does the linear model fit these data? Justify your answer using both graphical and numerical evidence.

**b.** Would an exponential model or a power model provide a better model for the growth of HIV cases worldwide? Justify your answer using both graphical and numerical evidence. .

**c.** Use the model you chose in part b to predict the number HIV infections in the year 2000

**d.**  Untransform the equation you used in part c. Use this equation to predict the number HIV infections in the year 2000 (this answer should be the same as your answer to #3)