Practice Problems – Statistics 10

1. The average gas mileage of the top selling minivans for each U.S. car manufacturer would best be modeled as what type of variable?

(a) Numerical variable

(b) Categorical variable

(c) Identifier variable

(d) None of the above

2. A zip code would best be modeled as what type of variable?

(a) Numerical variable

(b) Categorical variable

(c) Identifier variable

(d) None of the above

3. The distribution of marital status for members of a randomly selected group of adults would best be visualized by which plot?

(a) Boxplot

(b) Histogram

(c) Bar chart

(d) Scatterplot

4. This statement: "People with diabetes are at higher risk for certain cancers than those without the blood sugar disease, suggests a new study based on a telephone survey of nearly 400,000 adults." is referring to a:

(a) Observational study

(b) Controlled experiment

5. From the internet "One large study that included more than 2,800 people offered one of three mental training programs focused on memory, reasoning, or processing speed. The participants randomly assigned to the memory group, for instance, went through 10 hour-long training sessions that taught methods for remembering written materials, such as word lists. Two years after the training programs, people who participated in a mental exercise performed better on related tasks than others who did not participate." This is an example of a(n)

(a) Observational study

(b) Controlled experiment

Problems 6-8. A group of elementary school students is given a reading test and the scores are reported by reading grade level. The five-number summaries for the boys and girls given the test are shown below:

Boys	2.0	3.9	4.3	4.9	6.0
Girls	2.8	3.8	4.5	5.2	5.9

6. Which group had the highest score?

(a) Boys

(b) Girls

(c) They are equal

7. Which group had the greater range?

(a) Boys

(b) Girls

(c) They are equal

8 Which group had the greater interquartile range?

(a) Boys

(b) Girls

(c) They are equal

9. Ten parents were asked the ages of their oldest child. The results are shown below.

29 12 10 6 22 19 16 14 2 28

What is the interquartile range for this set of data?

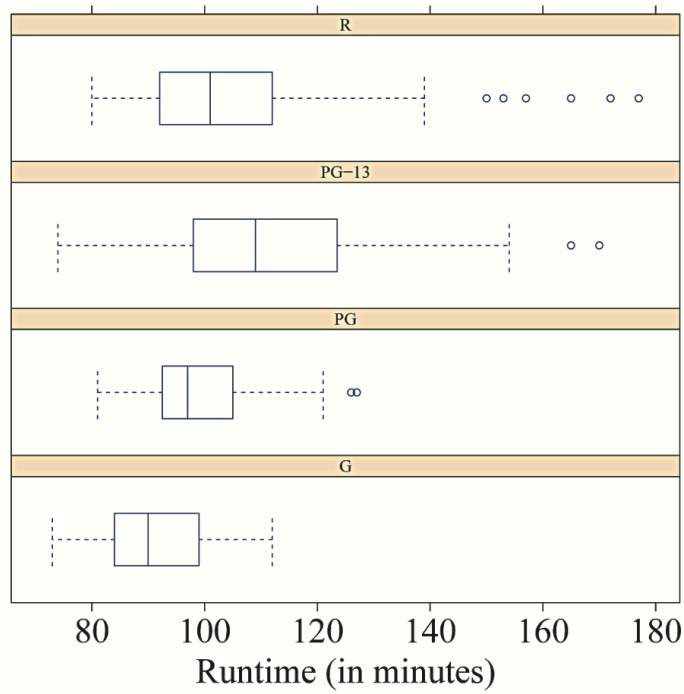
(a) 10

(b) 12

(c) 15

(d) 27

10. The boxplots below represent movie runtimes (length of a movie in minutes) for movies that have been R, PG-13, PG, and G. List ratings according to their median runtimes, from longest to shortest.



(a) R, PG-13, PG, G

(b) G, PG, PG-13, R

(c) G, PG, R, PG-13

(d) PG-13, R, PG, G

11. Consider the following statement: "Researchers from a prestigious university conducted a large study and determined that children who participated in school music programs scored higher on math exams in later grades than those who did not." Suppose that upon hearing this, Pawnee City Councilman Jeremy Jamm states that all children should participate in school music programs. What is wrong with the councilman's statement?

(a) He does not realize that difference in scores is due to the placebo effect.

(b) The councilman thinks the study is an anecdote even though it is an observational study.

(c) The councilman confused association with causation.

(d) There is nothing wrong with the councilman's statement.

12. The current mean price of gasoline in the United States is \$3.63 per gallon with a standard deviation of \$0.21. Please assume that gas prices are symmetric and unimodal for the purposes of this question. Gas in San Francisco, CA, is selling for \$4.02 per gallon today. What is this price in standard units? Assuming the Empirical Rule applies, would this price be unusual or not? Please round to the nearest hundredth.

(a) $z = 1.86$; This price would be unusual.

(b) $z = -1.86$; This price would be unusual.

(c) $z = 1.86$; This price would not be unusual

(d) $z = -1.86$; This price would not be unusual.

13. Which one of the following best describes the relationship between the correlation and the slope of the regression line modeling the relationship between X and Y?

(a) The correlation between X and Y equals the slope of the regression line modeling the relationship between X and Y.

(b) When the correlation between X and Y is zero, the slope of the regression line modeling the relationship between X and Y is negative.

(c) The sign of the correlation between X and Y is the same as the sign of the slope of the regression line modeling the relationship between X and Y.

(d) The correlation between X and Y is not related to the slope of the regression line modeling the relationship between X and Y.

(e) When the correlation between X and Y is zero, the slope of the regression line modeling the relationship between X and Y is positive.

Problems 14-16. The following linear regression model can be used to predict ticket sales at a popular water park:

$$\text{Predicted ticket sales per hour} = -631.25 + 11.25 \text{ Current temperature (in } ^\circ\text{F)}$$

14. What is the predicted number of tickets sold per hour if the temperature is 86°F? Round to the nearest whole ticket.

(a) About 252 tickets

(b) About 276 tickets

(c) About 301 tickets

(d) About 336 tickets

15. Choose the statement that best states the meaning of the slope in this context.

(a) The slope tells us that if ticket sales are decreasing there must have been a drop in temperature.

(b) The slope tells us that a one degree increase in temperature is associated with an average increase in ticket sales of 11.25 tickets.

(c) The slope tells us that high temperatures are causing more people to buy tickets to the water park.

(d) None of the above

16. In this context, does the intercept have a reasonable interpretation?

(a) Yes, it is reasonable for people to go to a water park when it is 0°F, so park managers might want to know how many tickets they would sell on average on a 0°F day.

(b) No, at a temperature of 0°F, ticket sales would be -631.25 and it is not reasonable (or possible) to have negative ticket sales.

(c) Not enough information available

Problem 17- 20.A random sample of 130 Americans was asked whether they believed intelligent life on other planets exists. Of 60 males in the random sample, 25 believed, of all the females in the random sample, 20 believed. Please assume that the 130 Americans were classified into only two genders, male and female.

17. One person is selected randomly from the 130, what is the probability that this person believes intelligent life on other planets exists?

(a) 0.346

(b) 0.702

(c) 0.119

(d) 0.030

(e) None of the above

18. One person is selected randomly from the 130, what is the probability that this person does not believe intelligent life on other planets exists given that this person is female?

(a) .207

(b) .588

(c) .714

(d) .923

19. One person is selected randomly from the 130, what is the probability that this person does not believe intelligent life on other planets exists or is male?

(a) .846

(b) .302

(c) .558

(d) .609

(e) None of the above

20. Are the events “female” and “believes intelligent life on other planets exists” independent?

(a) Yes, the occurrence of one of the events does not affect the other event

(b) Yes, the occurrence of one of the events does affect the other event

(c) No, the occurrence of one of the events does not affect the other event

(d) No, the occurrence of one of the events does affect the other event

(e) None of the above