1 (7 Points)

A researcher wants to learn whether regularly taking chromium picolinate may reduce elevated cholesterol values. The researcher is considering two approaches to study this issue: (a) a comparative randomized experiment or (b) an observational study.

Which do you think would provide better information about the effect of chromium picolinate on cholesterol values and why?

- [1] An observational study would provide the better information about the effect of chromium picolinate on elevated cholesterol values, because volunteers would chose to (or not chose to) take chromium picolinate.
- [2] An observational study would provide the better information about the effect of chromium picolinate on elevated cholesterol values, because the groups may differ in many ways that affect elevated cholesterol values.
- [3] A comparative experiment would provide the better information about the effect of chromium picolinate on elevated cholesterol values, because participants would be assigned to receive a placebo or the chromium picolinate.
- [4] A comparative experiment would provide the better information about the effect of chromium picolinate on elevated cholesterol values, because the groups may differ in many ways that affect elevated cholesterol values.
- [0] no answer or skip this item

Submit Answer

2 (7 Points)

A state has 10 universities, 25 four-year colleges, and 50 community colleges. Each of them offers multiple sections of an introductory statistics class each year. Researchers want to conduct a survey of students taking introductory statistics in the state. They obtain a list of all students taking an introductory statistics course in the state. The list is grouped by the type of institution. Students are randomly selected in an appropriate proportion of the total from each institution.

Which sampling plan best describes this process?

- [1] Simple random sampling
- [2] Stratified random sampling
- [3] Cluster sampling
- [4] Convenience sampling
- [0] no answer or skip this item

Submit Answer

3 (7 Points)

A researcher compared 50 married couples who own pets to 50 married couples who do not own pets. She used a standard questionnaire to assess marital satisfaction, and also asked the couples to record their social contacts for a two week period. The couples who owned pets scored higher on the marital satisfaction scale and had more social contacts than those without pets.

Identify the comment which best describes this study.

- [1] Pet ownership causes greater marital satisfaction

- [2] Some married couples should be randomly assigned to own pets and others to not own pets
- [3] Pet ownership is associated with higher marital satisfaction, however, we can not conclude any causal relationship.
- [4] Treatments perform better in an experiment than in the real world
- [0] no answer or skip this item

Submit Answer

4 (7 Points)

A study is done to compare the extent of heart disease in people who drink 1 to 2 alcoholic drinks per day to the extent of heart disease in non- drinkers. The researcher is able to study 200 individuals of each type.

Other factors that might affect the extent of heart disease are smoking habits and exercise habits. The smoking habits of the two groups of people are similar, but those who drank generally exercised less than the non-drinkers.

In this study, the explanatory variable is:

- [1] exercise
- [2] heart disease
- [3] smoking
- [4] drinking status
- [0] no answer or skip this item

Submit Answer

5 (7 Points)

Which one of the following statements is TRUE:

- [1] A parameter is different for each sample from a particular population.
- [2] A population parameter may only be based on a combination of real and conceptual measurements
- [3] A statistic is different for each sample from a particular population
- [4] The true value of a sample statistic can never be known
- [0] no answer or skip this item

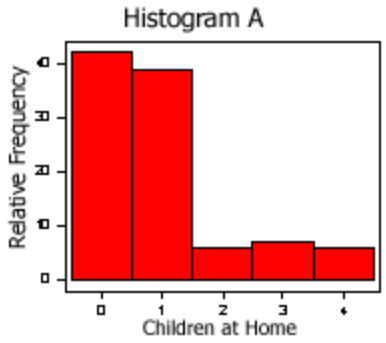
Submit Answer

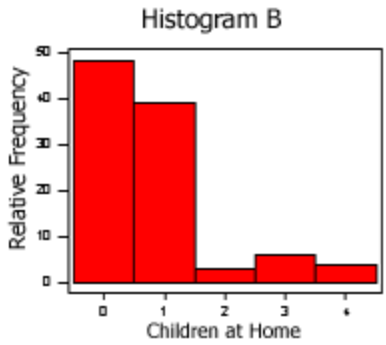
6 (7 Points)

The following table is based on the numbers of children living at home, for 100 statistics students:

# Children	Number of Students

0	42
1	39
2	6
3	7
4	6





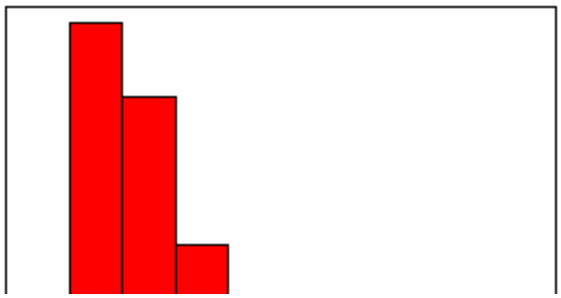
Which histogram corresponds to the data shown in the table?

- [1] Histogram A
- [2] Histogram B
- [3] Both - they are identical
- [4] None of them
- [0] no answer or skip this item

Submit Answer

7 (7 Points)

Here is a histogram based on data for the 50 states, showing the number of people in prison per 100,000 people.



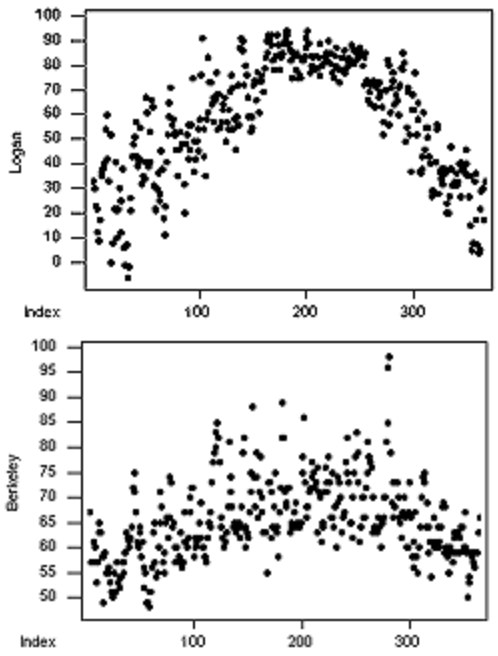
Based on this histogram, which is larger, the average or the median?

Submit Answer

8 (7 Points)

Here are scatter plots for Berkeley, California, and Logan, Utah in 1996. For both, X = day of the year and Y = high temperature for that day.

Consider the spread in high temperatures for the two locations over the year.

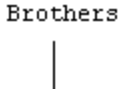


- [1] Logan has the greater spread
- [2] Berkeley has the greater spread
- [3] Both have the same spread
- [4] There is not enough information to answer the question
- [0] no answer or skip this item

Submit Answer

9 (7 Points)

The next plot has X = weight in pounds and Y = numbers of brothers for 120 students.



Which statement best describes the relationship between the Weight and the Brothers variables?

- [1] There is no consistent pattern.
- [2] Heavier people tend to have more brothers than lighter people.
- [3] Lighter people tend to have more brothers than heavier people.
- [4] Heavier people tend to have fewer brothers than lighter people.
- [0] no answer or skip this item

Submit Answer

10 (11 Points)

Use WebStat. Load from "Data > Sample data" the data set SMSA_data-59metro_areas.dat and compute the correlation coefficient for the variables "HCPot" and "NOxPot".

The correlation is closest to

CLICK HERE FOR Interactive Tool!

- [1] zero
- [2] -.50
- [3] 1.0
- [4] -.25
- [0] no answer or skip this item

Submit Answer

11 (7 Points)

Next are three plots based on the heights and weights of 126 college students. There is one plot each with

X = Weight in pounds and Y = Height in inches for the 126 people (Plot A);

X = Age in years and Y = Average Weight in pounds for everyone of Age X (Plot B);

X = Weight in pounds and Y = Weight in kilograms for the 126 people (Plot C).

Plot A	Plot B	Plot C
		

Which plot's correlation coefficient is an ecological correlation?

- [1] Plot A
- [2] Plot B
- [3] Plot C
- [4] All 3 plots
- [0] no answer or skip this item

Submit Answer

12 (7 Points)

225 manufactured items are randomly selected from a production run and 9 of them are defective.

The best guess for the probability that a randomly chosen item from this production run is defective is:

- [1] 0.09
- [2] 0.036
- [3] Insufficient information to answer this question is given.
- [4] 0.04
- [0] no answer or skip this item

Submit Answer

13 (7 Points)

A card is drawn from an ordinary deck of cards. The probability that a card is a diamond is 1/4. The probability that it is a king is 1/13. The probability that it is the king of diamonds is 1/52.

Which of the following statements is true?

- [1] The events "king" and "diamond" are independent and mutually exclusive
- [2] The events "king" and "diamond" are independent but not mutually exclusive
- [3] The events "king" and "diamond" are mutually exclusive but not independent
- [4] The events "king" and "diamond" are neither independent nor mutually exclusive
- [0] no answer or skip this item

Submit Answer

14 (7 Points)

Here are the results from a group of 235 freshmen who took a Math Anxiety survey.

Math Anxiety	Yes	No	Total
Male	68	50	118
Female	61	56	117
Total	129	106	235

If a student is randomly selected from this group, P(Math Anxiety) is:

- [1] 61/117
- [2] 68/129
- [3] 106/235
- [4] 129/235
- [0] no answer or skip this item

Submit Answer

15 (7 Points)

Two events are mutually exclusive if when one occurs:

- [1] The probability of the other is unchanged
- [2] The other will never occur
- [3] The other event will always occur
- [4] The probability of the other is changed
- [0] no answer or skip this item

Submit Answer

16 (12 Points)

The next interactivity creates scatter plots using data from a survey of a class of 120 students in a college statistics course. Create the plot with X = Height (in inches) and Y = Weight (in pounds).

What do you see? What outliers are there, if any?

CLICK HERE FOR Interactive Tool!

Submit Answer

17 (12 Points)

The next interactivity creates scatter plots using data from a survey of a class of 120 students in a college statistics course. Create the plot with X = Age (in years) and Y = Height.

Is there an evident trend? What outliers are there, if any?

CLICK HERE FOR Interactive Tool!

Submit Answer

18 (12 Points)

Use the Venn diagram in the next Interactive to investigate how the conditional probability of two events changes. **Drag A inside B, then completely outside B.**

What is P(A|B) when A is a subset of B?

CLICK HERE FOR Interactive Tool!

Submit Answer

19 (12 Points)

Look at the interactive boxplots for the athletes from the two sports separately.

What are the shortest heights for the two groups?

CLICK HERE FOR Interactive Tool!

Submit Answer

20 (12 Points)

Look at the interactive boxplots for the athletes from the two sports separately.

What are the median weights for the two groups?

CLICK HERE FOR Interactive Tool!

Submit Answer

21 (11 Points)

Suppose that a researcher wants to learn about whether regularly taking Vitamin C supplements may reduce the risk of getting a cold.

Describe how he or she might do a comparative randomized experiment to study this issue.

Submit Answer

22 (11 Points)

The faculty senate at a large university wanted to know what proportion of the students thought a foreign language should be required for everyone. The statistics department offered to cooperate in conducting a survey, and a simple random sample of 500 students was selected from all students enrolled in statistics classes. A survey form was sent by email to these 500 students.

Is the sample representative of the population of interest? Explain.

Submit Answer

23 (11 Points)

Obesity was not recognized as a health risk for many years because lurking variables were not accounted for in the studies. Here are typical data:

	Over-weight	NormalWeight
Early Death	50	60
Not Early	450	440

What is the probability of early death, given overweight?

Submit Answer

24 (11 Points)

What is your chance of getting a cold or the flu? Annually, about 25% of the U.S. population gets a cold and between 35 -50% gets the flu, but both illnesses are highly age-related. In 1994, for the 5-24 age group, 32.7 million of 74.8 million got the flu. For people 45 years of age and older, 18.8 million of 81.7 million got the flu.

What is the probability a young person, 5-24 years, will get the flu?

Submit Answer

25 (11 Points)

Take the daily high temperatures for the first week in January, 1996, at Berkeley, but pretend that one was missing and recorded as "9999", so that the data are given as 67, 67, 57, 57, 57, 61, 9999.

Find the average of these seven numbers (that is, pretend you do not realize the 9999 is not a true temperature). Compare this to the correct average of 60.8571. Is it very far off?

Submit Answer

26 (7 Points)

A business currently has 5 telephone lines. Suppose the number of lines in use at any one time has the following distribution:

Phone lines	Probability
0 lines	.10
1 line	.28
2 lines	.44
3 lines	.14
4 lines	.02
5 lines	.02

What is the probability that *more than* 2 lines are in use?

- [1] 0.82
- [2] 0.62
- [3] 0.38
- [4] 0.18
- [0] no answer or skip this item

Submit Answer

27 (7 Points)

Suppose the amount of time that a customer waits to be admitted to a popular restaurant is uniformly distributed. The probability density function is $f(x) = 0.5$ for $0 < x < 2$, $f(x) = 0$ otherwise.

What is the probability that a customer will have to wait more than 30 minutes (0.5 hours)?

- [1] 1/3
- [2] 1/2
- [3] 3/4
- [4] 1/4
- [0] no answer or skip this item

Submit Answer

28 (7 Points)

You are given the following probability distribution where the expected value of x is 5:

x	4	5	6
Prob(x)	0.2	0.6	0.2

What is the standard deviation of X?

- [1] 0.72
- [2] 0.63
- [3] 0.46
- [4] 0.4
- [0] no answer or skip this item

Submit Answer

29 (7 Points)

In a state lottery game, a player can win either $10,000, $1000, or nothing. The probability is 1/10000 that the player wins the $10,000 prize; the probability is 1/500 that the player wins the $1000 prize.

From the state's point of view, what is the mean payout per player?

- [1] $3
- [2] $170
- [3] $510
- [4] $0
- [0] no answer or skip this item

Submit Answer

30 (11 Points)

Suppose that only 23% of all drivers come to a complete stop at an intersection having flashing red lights in all directions when no other cars are visible.

For a simple random sample of 50 such drivers, find the expected number of drivers who will come to a complete stop.

Submit Answer

31 (11 Points)

A random number generator produces the digits 0 through 9 randomly.

What is the probability that a random digit will be more than 3?

Submit Answer

32 (11 Points)

A gene is called 'lethal' (L) if offsprings who receive 2 copies of the gene fail to develop. A cross of parents with one copy each of a dominant 'lethal' gene results in 2/3 of the offspring being carriers of the gene. The combination LL is never born, as illustrated in this table, with *l* being recessive:

Lethal Gene	father L	*l*	
Mother L	(L, L)	(L, *l*)	P(L, L) = 1/4 embryo fails to form
l	(L, *l*)	(*l*, *l*)	P(carrier) = P(L, *l*) = 2/3 of children born

You examine 60 offspring from this cross and count the number of offspring *x* who are carriers of the lethal trait.

Find the mean and the standard deviation of *x*.

Submit Answer

33 (12 Points)

A university realized that about 15% of its students fail the introductory statistics class. Assume that the binomial settings hold.

In a class of 60 students, how many students do we expect to fail? And what is the probability that at most 5 students from this class fail?

Use a binomial probability calculator of your choice to answer this question.

Submit Answer

34 (12 Points)

Use WebStat. Load from "Data > Sample data" the data set "Chicago_42_tallest_buildings.dat" and compute the correlation coefficient for the variables "Heights" and "Stories".

Report the correlation coefficient and make a statement of the form whether this correlation coefficient indicates whether we have a positive or a negative association. So, is this association strong?

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Submit Answer

35 (11 Points)

Use WebStat. Load from "Data > Sample data" the data set SMSA_data-59metro_areas.dat and compute summary statistics for the variables "JanTemp" and "JulyTemp".

Which of the following statements is NOT correct?

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- [1] The January temperatures have a higher variation than the July temperatures.
- [2] The mean temperature in January is lower than the mean temperature in July.
- [3] The higher range of temperatures has been observed for July.
- [4] All three statements are incorrect.
- [0] no answer or skip this item

Submit Answer

When you are done answering all questions above to your satisfaction, press the button below to complete your test.

Mark Test Completed