

Week #1 Exam

20 Multiple Choice Questions

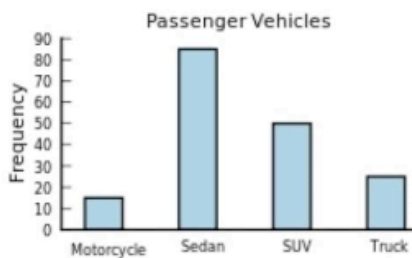
Problem 1.

The following frequency distribution presents the frequency of passenger vehicles that pass through a certain intersection from 8:00 AM to 9:00 AM on a particular day.

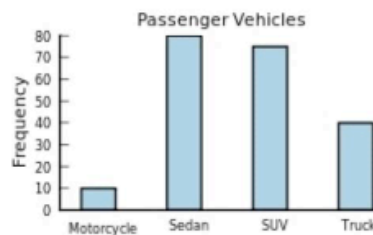
Vehicle Type	Frequency
Motorcycle	5
Sedan	95
SUV	65
Truck	30

Construct a frequency bar graph for the data.

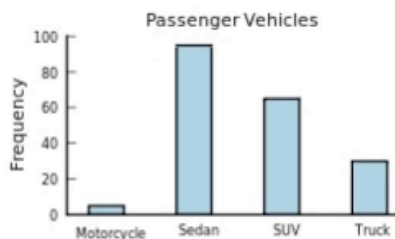
A)



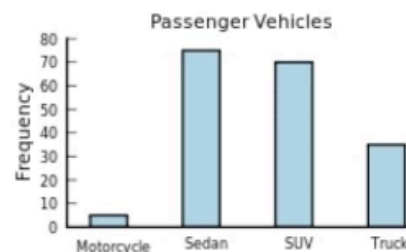
B)



C)



D)

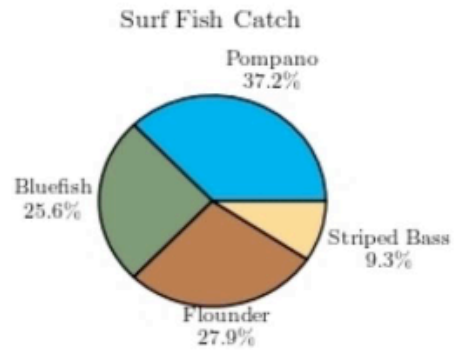


Answer: C

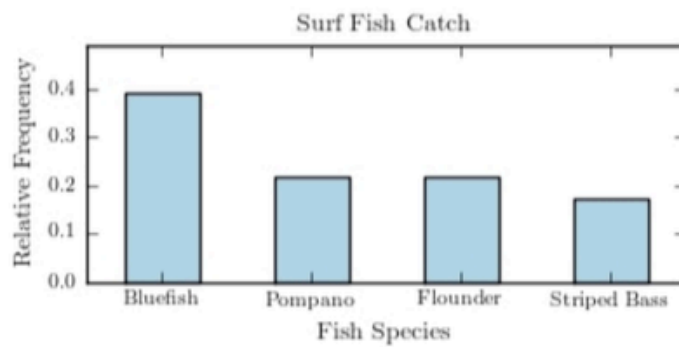
The height of the vertical bar reflects the corresponding frequency.

Problem 2.

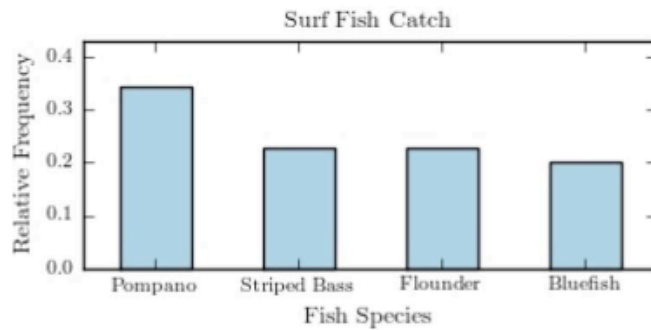
The following pie chart presents the percentages of fish caught in each of four ratings categories. Match this pie chart with its corresponding Pare-to chart.

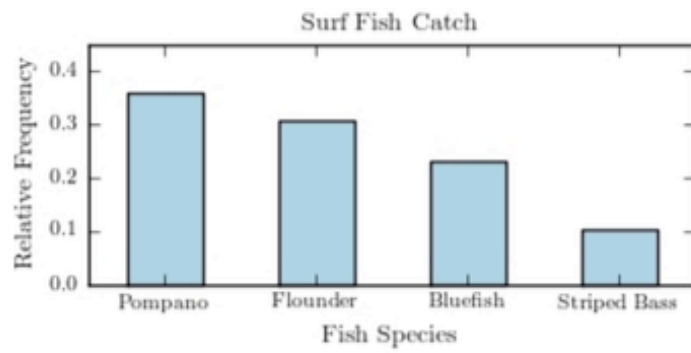


A

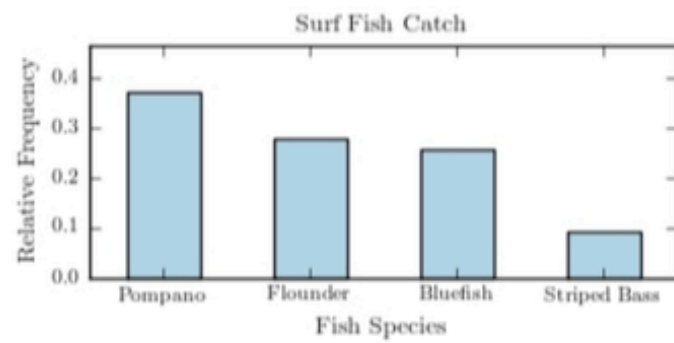


B.





D

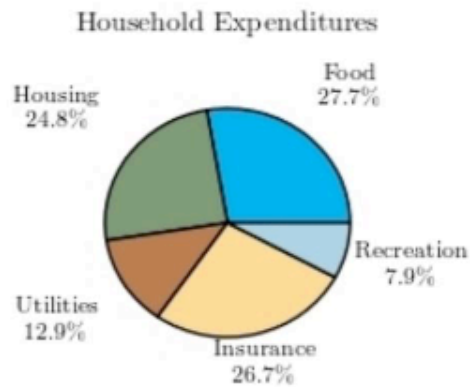


Answer D.

A simple conversion from the pie chart to the bar chart based on the relative frequencies.

Problem 3.

Following is a pie chart that presents the percentages spent by a certain household on its five largest annual expenditures. What percentage of the money spent was spent on food, housing, and utilities?



A) 60.4%

B) 65.4%

C) 52.5%

D) 47%

Answer: B

Adding up the percentages of food, housing, and utilities.

Problem 4.

You may be interested in identifying the mean height of all WCU students. There are about 17000 students at WCU, which means that it is time-consuming to measure the height of every single one. Instead, you may select a random sample of 100 WCU students and find the mean height of the students in just that sample. Suppose the mean turns out to be 36 feet.

A). 36 is the value of the population parameter

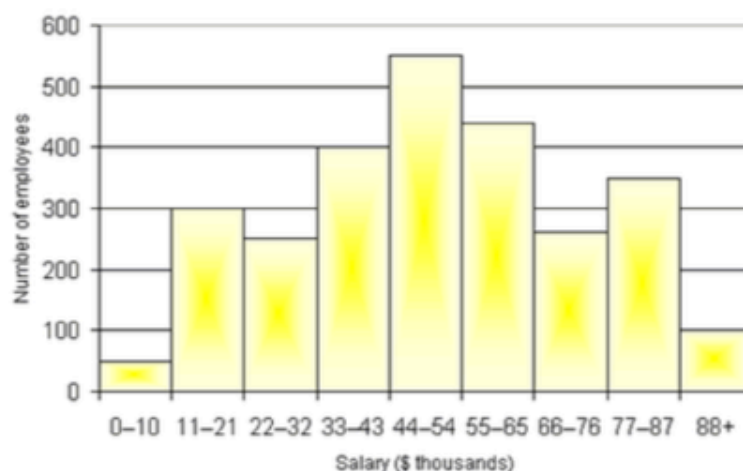
B). 36 is the value of a statistic

Answer B.

36 is based on the sample. It is the value of the statistic.

Problem 5.

The histogram below represents the results of a survey conducted from a local university asking recent graduates the amount of their first-year salary. How many recent graduates make less than 44,000 dollars?



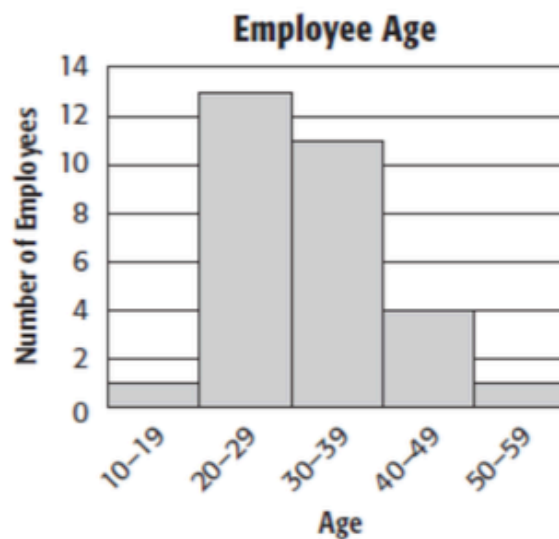
- A) 400
- B) 2,700
- C) 1,000**
- D) Cannot be determined using the information given

Answer: C

Adding up all graduates from categories 0 -10, 11-21, 22-32, 33-43.

Problem 6.

Cosmic, Inc. is a software company with 30 employees. The ages of the employees are displayed in the histogram.



How old is the youngest employee?

- A) 10
- B) 15
- C) 19
- D) Cannot be determined**

Answer: D

Since the age of individual employees is not given.

Problem 7.

A study of 1106 college students asked about their preference for online resources. The following relative frequency distribution was determined as a result of the survey.

Resource	Relative Frequency
Google or Google Scholar	0.736
Library database or website	0.136
Wikipedia or online encyclopedia	0.094
Other	0.034

Of the 1106 students who participated in the survey, approximately how many chose Google or Google Scholar?

- A. 34
- B. 292
- C. 736
- D. 814

Answer: D

$$1106 \times 0.736 = 814.$$

Problem 8.

A recent statistics exam yielded the following 25 scores. Construct a frequency table with the class limits shown below.

44 45 51 55 59 63 63 67 68 74 77 77
77 79 80 81 82 86 87 87 89 90 91 96 97

A.

Class Limits	Frequency
41-50	2
51-60	2
61-70	5
71-80	6
81-90	7
91-100	3

C.

B.

Class Limits	Frequency
41-50	3
51-60	2
61-70	4
71-80	7
81-90	6
91-100	3

D.

Class Limits	Frequency	Class Limits	Frequency
41-50	2	41-50	2
51-60	3	51-60	3
61-70	4	61-70	5
71-80	6	71-80	5
81-90	7	81-90	6
91-100	3	91-100	4

Answer: C

Based on the definition and steps for constructing a frequency table.

Problem 9

A list of 5 pulse rates is 70, 64, 80, 74, 92. What is the median for this list?

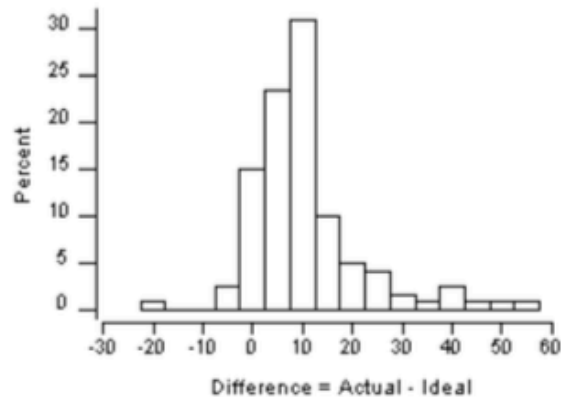
- a. 74
- b. 76
- c. 77
- d. 80

Answer A.

The middle value of the sorted data: 64, 70, 74, 80, 92

Problem 10

The following histogram shows the distribution of the difference between the actual and “ideal” weights for 119 female students. Notice that percent is given on the vertical axis. Ideal weights are responses to the question “What is your ideal weight”? The difference = actual – ideal.



The median of the distribution is approximately

- a. –10 pounds.
- b. 10 pounds.**
- c. 30 pounds.
- d. 50 pounds.

Answer: B

It is approximately in the center of the histogram.

Problem 11

If the variance of a data set is correctly computed with the formula using $n - 1$ in the denominator, which of the following is true?

- a. the data set is a sample**
- b. the data set is a population
- c. the data set could be either a sample or a population
- d. the data set is from a census
- e. None of the above answers is correct.

Answer: A

Use the definition of sample variance.

Problem 12

Based on the following sample of ages (in months) of 18 children at a daycare:

18 19 22 22 24 24 25 26 28 29 29 30 31 32 35 36 36 42

The 25th percentile, 75th percentile and the interquartile range for this data set are:

a) 23.5 , 34, 11.5

b) 24.5, 33.5 , 9

c) 24, 32, 8

d) 24, 32.5 8.5

e) 23, 32, 9,

Answer: C

Calculate the two quartiles. The range = maximum - minimum

Problem 13.

Three unbiased coins are tossed. What is the probability of getting at most two heads?

A) $\frac{3}{4}$

B) $\frac{1}{4}$

C) $\frac{7}{8}$

D) $\frac{3}{8}$

Answer: C.

Hint: list all possible outcomes in the sample space. This is essentially the same as the example of the “three-kid” problem we worked on in the class.

Problem 14

You decide to conduct a survey of families with two children. You are interested in counting the number of boys (out of 2 children) in each family. Is this a random variable, and if it is, what are all its possible values?

- A. Yes, it is a random variable, and its values can be 1 and 2.
- B. Yes, it is a random variable, and its values are 0, 1, or 2.
- C. Yes, it is a random variable, and its values can be 2 or 4.
- D. No, it is not a random variable since it is not random.

Answer: B

Use the definition of the random variable.

Problem 15.

Which of the following is **NOT** a property of a random variable?

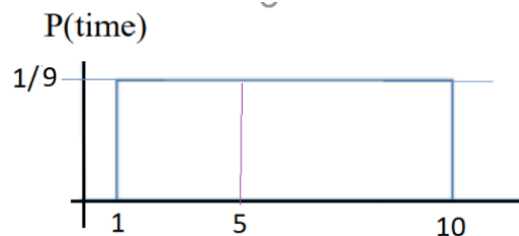
- A. The sum of the probabilities of a discrete random variable is equal to 1.
- B. The distribution function of a random variable cannot be negative.
- C. A random variable must be less than or equal to 1 and greater than or equal to 0.
- D. A random variable can be discrete or continuous.

Answer: C

Use the definition of the random variable.

Problem 16.

The following uniform distribution describes the wait time (in minutes) for passengers of the bus at a stop at the airport. What is the probability that a randomly selected passenger will wait between 5 and 10 minutes?



- A. $5/10$
- B. $5/9$
- C. $4/9$
- D. $4/10$
- E. Cannot be determined

Answer: B

Calculate the area of the region between 5 and 10. It is a rectangle: $(10-5) \times (1/9) = 5/9$.

Problem 17.

Suppose the time to wait for placing an order at a drive-through window has a uniform distribution between 0 and 8 minutes. What is the probability that a randomly selected customer will wait for exactly 5 minutes?

- A. $5/8$
- B. $3/8$
- C. 0
- D. $1/8$
- E. cannot be determined

Answer: C

This is a uniform distribution. It is a continuous random variable. The probability of taking a single value is always 0.

Problem 18

Assume that the time required to receive confirmation that an electronic transfer has occurred is **uniformly** distributed between 30 and 90 seconds. What is the probability that a randomly selected transfer will take less than 75 seconds?

- A. $15/60$
- B. $15/90$
- C. $30/90$
- D. $45/60$
- E. Cannot be determined

Answer: D

Use the area formula of the rectangle to find the probability: height = $1/(90-30) = 1/60$, width = $(75 - 30) = 45$ ("less than"). The probability = $45/60$.

Problem 19

Which of the following random variables should be considered continuous?

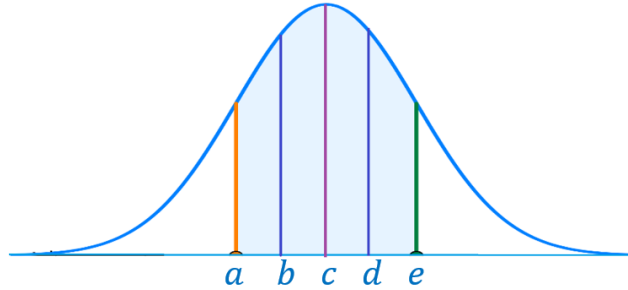
- A. The time it takes for a randomly chosen woman to run 100 meters.
- B. The number of brothers a randomly chosen person has.
- C. The number of cars owned by a randomly chosen adult male.
- D. The number of orders received by a mail-order company in a randomly chosen week.
- E. no continuous random variable is listed.

Answer: A

Time is a typical continuous variable. B-C are counts (number of).

Problem 20.

Assume the density curve of a continuous random variable is given below. a , b , c , d , and e are four distinct values of the random variable. Let $E = \{a, b, c, d, e\}$.



Find the probability $P(E)$.

- A. $1/5$
- B. $1/3$
- C. 0
- D. $1/(a+b+c+d+e)$
- E. Cannot be determined.

Answer: C.

The density curve indicates the continuity of the random variable. The probability of observing individual values is always 0. $P(a) = P(b) = P(c) = P(d) = P(e) = 0$. Therefore the sum of these probabilities is also 0.