

King Fahd University of Petroleum and Minerals  
Department of Mathematics  
**Stat 211**  
**Exam 1**  
**222**  
**February 20, 2023**  
**Net Time Allowed: 90 Minutes**

**MASTER VERSION**

1. The number of telephones per household is an example of:
- (a) A discrete numerical variable with ratio scale \_\_\_\_\_(correct)
  - (b) A continuous numerical variable with interval scale
  - (c) A continuous numerical variable with ratio scale
  - (d) A discrete numerical variable with interval scale
  - (e) A categorical variable with ordinal scale
2. The following is collected from students upon exiting the campus bookstore during the first week of classes:
- (i) Amount of time spent shopping in the bookstore
  - (ii) Number of textbooks purchased
  - (iii) Academic major
  - (iv) Gender
- Which of the following statements is true?
- (a) (iii) and (iv) are categorical variables with nominal scale \_\_\_\_\_(correct)
  - (b) (ii), (iii), and (iv) are categorical variables with nominal scale
  - (c) (i) and (ii) are continuous numerical variables with ratio scale
  - (d) (i) and (ii) are discrete numerical variables with ordinal scale
  - (e) (iii) and (iv) are categorical variables with ordinal scale

3. In 2008, a university in the midwestern United States surveyed its full-time first-year students after they completed their first semester. Surveys were electronically distributed to all 3,727 students, and responses were obtained from 2,821 students. Of the students surveyed, 90.1% indicated that they had studied with other students, and 57.1% indicated that they had tutored another student. The report also noted that 61.3% of the students surveyed came to class late at least once, and 45.8% admitted to being bored in class at least once.

From the paragraph above, which of the following statements is correct?

- (a) The population of the students is 3727 \_\_\_\_\_(correct)
- (b) The population of the students is 2821
- (c) 90.1% is a parameter
- (d) The sample size is 3727
- (e) 2821 is a statistic
4. (Use Data 1) Which variables in the survey are categorical?

- (a) gender, class, major, grad school, employment status, satisfaction advisement.  
(correct)
- (b) class, major, grad school, height, employment status, satisfaction advisement.
- (c) gender, GPA, major grad school, employment status, satisfaction advisement.
- (d) gender, class, major grad school, expected salary, satisfaction advisement.
- (e) age, class, major, grad school, employment status, satisfaction advisement.

5. (Use Data 1) Which variables in the survey are numerical?
- (a) age, GPA, expected salary, registered social network sites, money spent, expected wealth accumulated. \_\_\_\_\_(correct)
  - (b) age, gender, GPA, expected salary, registered social network sites, money spent.
  - (c) age, GPA, employment status, registered social network sites, expected wealth accumulated.
  - (d) age, GPA, grad school, registered social network sites, money spent.
  - (e) age, GPA, expected salary, registered social network sites, satisfaction advisement.
6. To study a situation in which the Pareto chart proved to be especially appropriate, consider the problem faced by a bank. The bank defined the problem to be the incomplete automated teller machine(ATM) transactions. Data concerning the causes of incomplete ATM transactions were collected and stored. The following table shows the causes of incomplete ATM transactions and the frequency of incomplete ATM transactions due to each cause:

Causes	Frequency
ATM malfunctions	32
ATM out of cash	28
Invalid amount requested	23
Lack of funds in account	19
Magnetic strip unreadable	234
Warped card jammed	365
Wrong key stroke	23
<b>Total</b>	<b>724</b>

Identify the vital few categories, what is the combined percentage of these vital few categories?

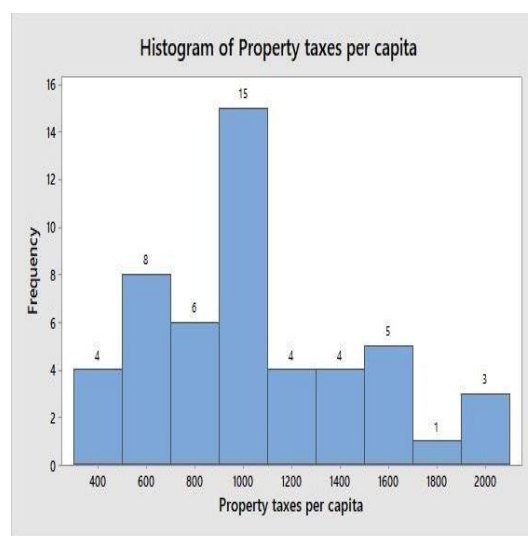
- (a) 82.73% \_\_\_\_\_(correct)
- (b) 87.15%
- (c) 91.02%
- (d) 58.7%
- (e) 49.59%

7. Does it take more time to get yourself removed from an email list than it used to? A study of 100 large online retailers revealed the following:

Year	Need 3 or more clicks to be removed	
	Yes	No
2009	39	61
2008	7	93

In 2009, what is the percentage of retailers that need three or more clicks?

- (a) 39% \_\_\_\_\_(correct)
- (b) 7%
- (c) 19.5%
- (d) 78%
- (e) 84.78%
8. The following histogram visualizes the data about the property taxes per capita for the 50 states and the District of Columbia:



What is the cumulative frequency of property taxes per capita greater than 1000?

- (a) 17 \_\_\_\_\_(correct)
- (b) 33
- (c) 20
- (d) 34
- (e) 22

9. The file contains the following data about the cost of electricity during July 2010 for a random sample of 50 one-bedroom apartments in a large city:

82 90 95 96 102 108 109 111 114 116  
119 123 127 128 129 130 130 135 137 139  
141 143 144 147 148 149 149 150 151 153  
154 157 158 163 165 166 167 168 171 172  
175 178 183 185 187 191 197 202 206 213

Make a frequency histogram with **starting value 80 and interval width 20**. What is the midpoint of the bar (rectangle) which has the highest frequency?

- (a) 150 \_\_\_\_\_(correct)  
(b) 130  
(c) 110  
(d) 90  
(e) 170

10. The mean, median and standard deviation, respectively, are:

The amount that a sample of nine customers spent for lunch (\$) at a fast-food restaurant is given by the following table:

4.20 5.03 5.86 6.45 7.38 7.54 8.46 8.47 9.87

- (a) 7.03, 7.38 and 1.81 \_\_\_\_\_(correct)  
(b) 7.03, 7.50 and 1.81  
(c) 7.03, 7.50 and 3.28  
(d) 7.25, 7.38 and 1.81  
(e) 7.25, 7.38 and 3.28

11. The  $z$ -score and coefficient of variation for the maximum value, respectively, are:  
The amount that a sample of nine customers spent for lunch (\$) at a fast-food restaurant is given by the following table:

4.20   5.03   5.86   6.45   7.38   7.54   8.46   8.47   9.87

- (a) 1.57 and 25.75% \_\_\_\_\_(correct)  
(b) 1.57 and 79.56%  
(c) 2.57 and 24.53%  
(d)  $-1.57$  and 25.75%  
(e)  $-2.57$  and 46.66%
12. Suppose that the rate of return for a particular stock during the past two years was 20% and 30%. Compute the geometric rate of return per year.

- (a) 24.9% \_\_\_\_\_(correct)  
(b)  $-8.3\%$   
(c) 19.6%  
(d) 14.7%  
(e) 32.1%

13. The following data contain the overall miles per gallon (MPG) of 2010-small SUVs:

24 23 22 21 22 22 18 18 26  
26 26 19 19 19 21 21 21 21  
21 18 19 21 22 22 16 16

The first quartile, third quartile and the interquartile range, respectively, are:

- (a)  $Q1 = 19$ ,  $Q3 = 22$  and  $IQR = 3$  \_\_\_\_\_(correct)  
(b)  $Q1 = 18$ ,  $Q3 = 22$  and  $IQR = 4$   
(c)  $Q1 = 19$ ,  $Q3 = 23$  and  $IQR = 4$   
(d)  $Q1 = 21$ ,  $Q3 = 23$  and  $IQR = 2$   
(e)  $Q1 = 19$ ,  $Q3 = 24$  and  $IQR = 5$

14. If  $P(A \text{ and } B) = 0.4$  and  $P(B) = 0.8$ , find  $P(A|B)$ .

- (a) 0.5 \_\_\_\_\_(correct)  
(b) 0.32  
(c) 0.2  
(d) 0.08  
(e) 0.16



15. According to a Gallup poll, the extent to which employees are engaged with their work-place varies from country to country. The results of the poll are summarized in the following table:

	Country		
Engagement	United States	Germany	Total
Engaged	550	246	796
Not Engaged	1345	1649	2994
<b>Total</b>	<b>1895</b>	<b>1895</b>	<b>3790</b>

Given that the worker is from Germany, what is the probability that the worker is engaged?

- (a)  $\frac{246}{1895}$  \_\_\_\_\_(correct)
- (b)  $\frac{246}{3790}$
- (c)  $\frac{1895}{3790}$
- (d)  $\frac{246}{796}$
- (e)  $\frac{796}{1895}$

16. Olive Construction Company is determining whether it should submit a bid for a new shopping center. In the past, Olive's main competitor, Base Construction Company, has submitted bids 70% of the time. If Base Construction Company does not bid on a job, the probability that Olive Construction Company will get the job is 0.50. If Base Construction Company bids on a job, the probability that Olive Construction Company will get the job is 0.25. If Olive Construction Company gets the job, what is the probability that Base Construction Company did not bid?

- (a) 0.4615 \_\_\_\_\_(correct)
- (b) 0.15
- (c) 0.325
- (d) 0.3
- (e) 0.75

17. Suppose the following information is collected from Robert Keeler on his application for a home mortgage loan at the Metro Country Savings and Loan Association.
1. Monthly payments
  2. Number of jobs in past 10 years
  3. Annual family income
  4. Marital status

Which of the following responses is correct about the type of data and measurement scale:

- (a) 1 and 3 are numerical, continuous, ratio scale \_\_\_\_\_(correct)
  - (b) 1 and 3 are numerical, discrete, ratio scale
  - (c) 2 and 3 are categorical, nominal scale
  - (d) 1 and 4 are categorical, ordinal scale
  - (e) 1 and 3 are numerical, continuous, interval scale
18. A sample of 500 respondents in a large metropolitan area was selected to study consumer behaviour. Among the questions asked was “Do you enjoy shopping for clothing?” Of 240 males, 136 answered yes. Of 260 females, 224 answered yes. What is the probability that a respondent chosen at random is a female OR enjoys shopping for clothing?

- (a) 0.792 \_\_\_\_\_(correct)
- (b) 0.728
- (c) 0.992
- (d) 0.896
- (e) 0.488

19. Suppose that cars are categorized according to whether a car needs warranty-related repair (yes or no) and the country in which the company manufacturing a car is based (United States or not United States). Based on the data collected, the probability that the new car needs a warranty repair is 0.04, the probability that the car is manufactured by a U.S.-based company is 0.60, and the probability that the new car needs a warranty repair and was manufactured by a U.S.-based company is 0.025. Suppose you know that a company based in the United States did not manufacture a particular car. What is the probability that the car needs warranty repair?

- (a) 0.0375 \_\_\_\_\_(correct)
- (b) 0.0417
- (c) 0.0240
- (d) 0.0001
- (e) 0.0153

20. A municipal bond service has three rating categories (A, B, and C). Suppose that in the past year, of the municipal bonds issued throughout the United States, 70% were rated A, 20% were rated B, and 10% were rated C. Of the municipal bonds rated A, 50% were issued by cities. Of the municipal bonds rated B, 60% were issued by cities. Of the municipal bonds rated C, 90% were issued by cities.

If a new municipal bond is to be issued by a city, what is the probability that it will receive an A rating?

- (a) 0.625 \_\_\_\_\_(correct)
- (b) 0.560
- (c) 0.325
- (d) 0.929
- (e) 0.675