Concordia University

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School of Business

Supply Chain and Business Technology Management

GDBA 530 A: Business Data Analytics

Fall 2018

First Class Test

Name: KEY (Last, First)

Student I.D.#:_____

DIRECTIONS: The exam is divided into 2 parts: **PART A)** "Multiple Choice", and **PART B)** "Problems to be solved". For Part A, indicate the most appropriate answer. For Part B, work problems in the space provided and ***please show all work and the formulas used***. You may use your book, notes and a calculator. GOOD LUCK!

Question	Maximum	Your Grade
Part A	24	
Part B	33	
Total:	57	

MBA 608 A FIRST CLASS EXAM F2018

PART A Part "A" Directions: For each of the "Multiple Choice" questions please insert the letter representing the best answer (in capital block letters) in the space provided to the right of each question ("Multiple Choice" questions count 2 points each).

Name _____ **(LAST, FIRST)**

Student Number: _____

MULTIPLE CHOICE. **Choose the one alternative that best completes the statement or answers the question.**

1) Researchers are concerned that the weight of the average Canadian school child is increasing implying, among other things, that children's clothing should be manufactured and marketed in larger sizes. If X is the weight of school children sampled in a nationwide study, then X is an example of

1) E

A) a discrete random variable.
B) a categorical random variable.
C) a parameter.
D) a census
E) a continuous random variable.

2) The average score for a class of 50 students was 70. The 30 male students in the class averaged 80. The 20 female students in the class averaged?

2) D

A) none of the other answers are correct
B) 65
C) 60
D) 55
E) 68

3) The employees of a company were surveyed on questions regarding their educational background and marital status. Of the 600 employees, 400 had college degrees, 100 were single, and 60 were single college graduates. What is the probability that an employee of the company is married and has a college degree?

3) D

A) 500/600
B) 40/600
C) none of the other answers are correct
D) 340/600
E) 400/600

TABLE 2-5

The following are the durations in minutes of a sample of long-distance phone calls made within Canada reported by one long-distance carrier.

Time (in Minutes)	Relative Frequency
0 but less than 5	0.02
5 but less than 10	0.07
10 but less than 15	0.07
15 but less than 20	0.10
20 but less than 25	0.15
25 but less than 30	0.22
30 or more	0.37

4) Referring to Table 2-5, if 100 calls were sampled_____of them would have lasted less than 5 minutes or at least 30 minutes or more? 4) A

A) none of the other answers are correct
B) 35
C) 2
D) 37
E) 61

5) The manager of a fast food restaurant asks customers to complete a one question questionnaire that asks customers who just purchased food to indicate whether they are 1) very happy, 2) somewhat happy, 3) Just OK, 4) somewhat unhappy 5) very unhappy with the service. The data collecterd from this questionnaire is an example of what type of measurment scale? 5) A

A) an ordinal scale variable.
B) an interval scale variable.
C) a nominal scale variable.
D) a ratio scale variable.

6) Most analysts focus on the cost of tuition as the way to measure the cost of a college education. But incidentals, such as textbook costs, are rarely considered. A researcher at Concordia University wishes to estimate the textbook costs of first-year students at Concordia. To do so, she monitored the textbook cost of 250 first-year students and found that their average textbook cost was $300 per semester. Identify the population of interest to the researcher. 6) A

A) all first-year Concordia University students
B) the 250 students that were monitored
C) all university students
D) all Concordia University students

7) The Dean of Students mailed a survey to a total of 400 students. The sample included 100 students randomly selected from each of the freshman, sophmore, junior, and senior classes on campus last term. What sampling method was used? 7) D

A) simple random sample
B) none ofthe other answers are correct
C) cluster sample
D) stratified random sample
E) systematic sample

8) If two events are independent, what is the probability that they both occur? 8) D
A) 0.50
B) 0
C) 1.00
D) cannot be determined from the information given

TABLE 2-4

A survey was conducted to determine how people rated the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

Stem	Leaves
3	24
4	03478999
5	0112345
6	12566
7	01
8	
9	2

9) Referring to Table 2-4, what percentage of the respondents rated overall television quality with a rating of 60 and below? 9) B

A) 88
B) none of the other answers are correct
C) 32
D) 28
E) 0

10) David Dion, VP for the Bank of Montreal, is reviewing the employee training programs at the Bank of Montreal. His staff compiled the following table of eregianl statistics on teller training hours: 10) D

	Easter Region	Western Region
Mean	20	28
Median	20	20
Mode	20	21
Standard Deviation	5	7
Variance	25	49

A) the Western Regions distribution has a greater dispersion
B) the Eastern Region distribution has a greater dispersion
C) the Eastern Region distribution is skewed to the left
D) the Western Region distribution is skewed to the right

11) A manager of a child day care center takes care of 40 cgukdren whose ages are given below: 11) D

Age	# of Children
1	2
2	8
3	6
4	10
5	14

The median age for the children is?
A) 6 B) 5 C) 3 D) 4 E) 1

12) Portfolio A of a collection of stocks is considered more risky than portfolio B if 12) D

A) portfolio A has a higher standard deviation.
B) portfolio A has a higher median than portfolio B
C) portfolio A has a higher mean than portfolio B.
D) portfolio A has a higher coefficient of variation than portfolio B.
E) portfolio A has a higher variance than portfolio B.

First Class EXAM, MBA 608, Part B (Fall 2018)

Directions: Please answer all of the following questions in the space provided. Please show ALL of your calculations and formulas used.

1) In a survey of MBA students, the following data were obtained on students first reason for applying to the school they attended:

Reason for Application

		School Quality	School Cost or Convenience	Other	Totals
Enrollment Status	**Full Time**	421	393	76	890
	Part Time	400	593	46	1039
	Totals	821	986	122	1929

a) Develop a joint probability table? (2points)

	SQ	SC/C	O	TOTAL
FT	.218	.204	.039	.461
PT	.208	.307	.024	.539
TOTAL	.426	.511	.063	1.000

b) Use the marginal probabilities of "school quality", "cost/convenience", and "other" to comment on the most important reason for choosing a school (2 points)

Most likely to cite cost or Convenience as the first reason- Probability of .511

c) If a student goes full time, what is the probability that school quality is the first reason for choosing a school? (3 points)

$$P(Q \mid FT) = \frac{P(Q \text{ and } FT)}{P(FT)}$$

$$= \frac{.218}{.461}$$

$$= .473$$

d) If A student is randomly selected from the results of this survey, what is the probability he/she is either a "full time" student or applied to the school because of "school quality" (3 points)

$$P(FT \text{ OR } SQ) = P(FT) + P(SQ) - P(FT \text{ and } SQ)$$
$$= .461 + .426 - .218$$
$$= .887 - .218$$
$$= .669$$

2) A Canadian Association of Individual Investors (CAII) survey found that 20% of all CAII members had purchased shares of stocks directly through an initial public offering (IPO). In a sample of 4 CAII members,

a) What is the probability exactly three members have purchased IPO's (3 points)

$$P(3) = {}_4C_3 (.2)^3 (.8)^1 = \frac{4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1 \cdot 1} (.008)(.8)$$
$$= 4(.0064)$$
$$= .0256$$

b) What is the probability that at lease one member has purchased an IPO? (3 points)

$$P(\text{At Least One}) = 1 - P(0)$$
$$= 1 - {}_4C_0 (.2)^0 (.8)^4$$
$$= 1 - (.8)(.8)(.8)(.8)$$
$$= 1 - .4096$$
$$= .5904$$

c) What is the mean and variance of the CAII members in the sample of 4 who have purchase an IPO? (3 points)

$$\mu = E(x) = n(\pi) = 4(.2) = .8$$
$$\sigma^2 = n(\pi)(1-\pi) = .4(.2)(.8) = .64$$

3) For the following data: 5, 15, 29, 10, 8, 12, 16, 10, 5

a) Show the five number summary (5 points)

ARRAY: 5, 5, 8, 10, 10, 12, 15, 16, 29
(1) (2) (3) (4) (5) (6) (7) (8) (9)

Q_1 POSITION $= \frac{n+1}{4} = \frac{9+1}{4} = 2.5 \therefore Q_1 = \frac{5+8}{2} = \underline{\underline{6.5}}$

Q_2 POSITION $= \frac{n+1}{2} = \frac{9+1}{2} = \frac{10}{2} = 5 \therefore Q_2 = \underline{\underline{10}}$

Q_3 POSITION $= \frac{3(n+1)}{4} = \frac{3(10)}{4} = 7.5 \therefore Q_3 = \frac{15+16}{2} = \underline{\underline{15.5}}$

FIVE NUMBER SUMMARY: X_L, Q_1, Q_2, Q_3, X_H
: 5, 6.5, 10, 15.5, 29

b) Comment on the shape of the distribution with a justification for your comments (2 points)

$\bar{X} = \Sigma X / n = 110/9 = 12.22$

$\bar{X} = 12.22 > M_d = 10$

$\therefore$ SKEWED TO THE RIGHT

c) Would any of the above values be considered an outlier?...justify your answer (3 points)

$Q_3 - Q_1 = IQR = 15.5 - 6.5 = 9.0$

LOWER LIMIT $= Q_1 - 1.5[IQR] = Q_1 - 1.5(9.0) = 7 - 1.5(9.0)$

$= 7 - 13.5 = -\underline{6.00}$

UPPER LIMIT $= Q_3 + 1.5[IQR] = Q_3 + 1.5(9.0) = 15.5 + 13.50$

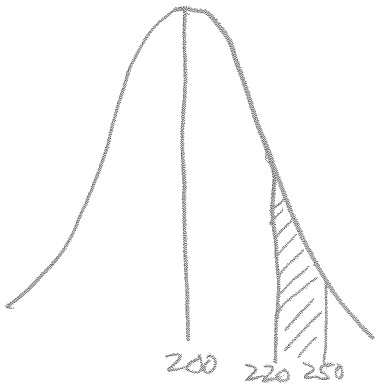
$= \underline{29.00}$

$29 \not> 29$ $\therefore$ 29 WOULD NOT BE CONSIDERED AN OUTLIER

$5 < -7$ $\therefore$ 5 WOULD NOT BE CONSIDERED AN OUTLIER

4 The demand fort a new product is assumed to be normally distributed with $\mu = 200$ and $\sigma = 40$. Letting x be the number demanded, find the following probability: (4 points)

$P(220 \leq X \leq 250) =$ .2029



$$Z = \frac{X - \mu}{\sigma} = \frac{250 - 200}{40} = \frac{50}{40} = 1.250$$

$$Z = \frac{X - \mu}{\sigma} = \frac{220 - 200}{40} = \frac{20}{40} = .500$$

T.I.

.8944

− .6915

.2029