

Given Name:_____ Family Name:_____

Student Number:_____ Signature:_____

University of Guelph
Department of Economics and Finance
College of Business and Economics

ECON* 2740 (Economic Statistics)

Instructor: Chen & Maynard

Midterm
VERSION CODE: D
Fall, 2019

Duration: 120 minutes

Aids Allowed: One two-sided handwritten 4 by 6 inch index card formula sheet. Only simple calculators without programming and scientific functions allowed as determined by the exam proctors. No other electronic devices permitted.

Answer all questions.

- Multiple choice questions should be answered on the Computer Answer Sheet. All other questions must include all work on the exam. No credit without work.
- Identify yourself (**name & student #**) on the Computer Answer Sheet by filling in the circles.
- Sign your exam, initial each page, and keep your student ID out on the desk in front of you.
- Use only an HB or soft pencil to completely darken the appropriate choice on the answer sheet.
- With the sole exception of simple, non-programable, non-scientific calculators, use of electronic devices is not permitted. Determination of which calculators are permitted is at the sole discretion of the exam proctors. Please turn off your cell-phone and all other electronic devices, placing these together with any personal items at the front of the room.
- You cannot leave the room during the exam without explicit permission from the proctor.
- The total marks are provided at the end of your exam.
- Hand in your entire exam together with your computer sheet at the end of the exam.

Do not hesitate to raise your hand if you have a question. For any sub-question marked “election available” you may irrevocably elect to obtain the final answer (but not all the work) to that sub-question from the proctor in exchange for giving up all the points on that sub-question plus one additional point. After viewing the answer you cannot change your mind.

Good Luck!

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Long Answer

Please include all your work on the exam. No credit will be given for answers without work, even when the final answer is correct.

1. Long Answer I.

- (a) [6] Please fill in the missing entries in the table of joint and marginal probabilities directly below. You may use the table to answer the remaining sub-questions. [**Election Available**]:

	B	B^C	marginal
A	0.3		0.5
A^C		0.4	
marginal			

- (b) [3] Calculate $P(A|B)$

- (c) [3] Calculate $P(A \cup B)$

2. A company's board wants to determine the relationship between the news about the company and the company's stock return. The cross-classification table below shows the number of days for each joint category. For example, it indicates that there were 60 days in which there was no news about the company and the company's stock had a positive daily return (the company's stock price rose).

Cross-Classification Tables (number of days)

	negative return	positive return
Good news	5	20
No news	40	60
Bad news	15	5

- (a) [4] One board member is uninterested in the firm's daily stock price fluctuations and wants to know how often there is good or bad news about the company. Please complete the table below for presentation to the board member and answer his questions below where indicated:

	Frequency	Relative Frequency	Cumulative Relative Frequency
Good news			
No news			
Bad news			

Board Member Question 1: $P(\text{Good news}) =$ _____

- (b) [5] A second board member wants to compare how often the stock price rises on good news days versus on bad news days. Please prepare the Row Relative Frequency Table Below to show the proportion of days on which the stock market rises or falls when there is good news, now news and bad news. Please also answer the board member's question where indicated.

Row Relative Frequency Tables

	negative return	positive return
Good news		
No news		
Bad news		

Board Member Question 2: $P(\text{Positive Return}|\text{Good News}) =$ _____

Board Member Question 3: $P(\text{Positive Return}|\text{Bad News}) =$ _____

Multiple Choice

Please record all answers on your computer answer sheet using an HB or soft pencil. Be sure to erase fully.

- [3] For free point(s), enter the correct version code on your computer answer sheet and mark the version code on all pages of the test. (Warning: If this information is not correctly entered, the scantron could missgrade your exam)

Hint: Your version of the exam is version: **D**

- My version of the exam is version A
 - My version of the exam is version B
 - My version of the exam is version C
 - My version of the exam is version D
 - My version of the exam is version E
- [3] Consider the following 3 observations: 8, 12, 19. The sample mean is closest or equal to:
 - 11
 - 12
 - 12.5

- (d) 13
(e) 18.5
3. [3] Consider the same three observations as in Question 2. The sample variance is closest or equal to:
- (a) 5
(b) 6
(c) 20
(d) 31
(e) 62
4. [3] Consider the following observations: 3,9,5,7,12,10. The median is closest or equal to:
- (a) 5
(b) 6
(c) 7
(d) 8
(e) 9
5. [3] Lucinda argued that people who eat larger quantities of carbohydrates will tend also eat more vegetables. According to Lucinda, they simply have larger appetites. Melinda argued the opposite. She thinks that people who eat larger quantities of carbohydrates will tend to eat smaller quantities of vegetables. According to Melinda's theory, people who fill up on carbohydrates have less room for vegetables. They collected the following three observations

individual	servings of vegetables	servings of carbohydrates
1	3	5
2	2	1
3	1	3
mean	2	3
sample variance	1	4

The sample correlation between servings of vegetables and servings of carbohydrates is closest or equal to:

- (a) 0
(b) 0.25
(c) 0.5
(d) 0.75
(e) 1

6. [3] A bank has collected their return data for the past 19 years in the following table:

year	yearly percentage return
2000	5.4
2001	2.3
2002	4.5
2003	7.8
2004	8.2
2005	9.4
2006	6.4
2007	-2.5
2008	-30.6
2009	-3.5
2010	2.3
2011	4.5
2012	3.5
2013	6.2
2014	7.3
2015	8.3
2016	4.6
2017	9.2
2018	1.3

The 5 percent value at risk (defined as the 5 percent percentile) is closest or equal to: [**hint:** a little thought could save you a lot of time. Do you really need to re-order it all?]

- (a) -30.6
 - (b) -3.5
 - (c) 2.3
 - (d) 9.2
 - (e) 9.4
7. [3] Derek was planning to go on a diet before trying out for his university basketball team. However, in statistics class he analyzed data on a random sample of 10,000 individuals and found discovered that height and weight are positively correlated. Since Derek, does not want to get any shorter before the basket ball tryouts, he gave up his diet plan. The most obvious with Derek's decision is that:
- (a) Derek didn't realize that this was time series data
 - (b) Derek made inferences about the population based on the sample
 - (c) Derek assumed causation when he found only correlation
 - (d) Derek did not realize that this was a case of direct causation
 - (e) Derek did not realize that there was sampling error.

8. [3] A researcher conducts a Facebook poll to determine the amount of time that people spend on social media and whether, when using a phone (land or cell), they block calls from numbers that they don't recognize. Both surveys are comprised of 1200 responses. A second researcher asks the same questions using a dual frame (land and cell) telephone survey. Considering the possible flaws in both survey methods, it seems most reasonable to expect:
- (a) The Facebook poll shows both higher average social media use and a higher proportion of phone blockers as compared to the phone poll.
 - (b) The Facebook poll shows both a lower average social media use and a lower proportion of phone blockers as compared to the phone poll.
 - (c) The Facebook poll shows a higher average social media use, but a lower proportion of phone blockers as compared to the phone poll.
 - (d) The Facebook poll shows a lower average social media use, but a higher proportion of phone blockers as compared to the phone poll.
 - (e) The Facebook poll is subject to greater sampling error than the phone poll.
9. [3] A professor wishes to study the relationship between performance on the midterm and final exam. Using the scores from her previous class of 250 students, she calculates that the covariance between the midterm and final exam scores is 15, while the variance of the midterm exam is 36 and the variance of the final exam is 25. The professor's data is most accurately described as:
- (a) data from a controlled experiment
 - (b) survey data
 - (c) observational data
 - (d) categorical
 - (e) ordinal data
10. [3] Consider the same information as in Question 9. The proportion of the variation in the final exam that is predicted by (or possibly explained by) variation in the midterm exam is closest or equal to:
- (a) 25 percent
 - (b) 37.5 percent
 - (c) 50 percent
 - (d) 62.5 percent
 - (e) 75 percent
11. [3] Consider again the same information as in Question 9. The professor believes the results show that students who well on the midterm gain confidence that helps them perform well on the final. Her TA has a different interpretation. She notices that the students who did well on both exams tended to be those same students that show up regularly to her lab and worked hard on their homework assignments. Which best describes the differing interpretations of the professor and her TA:

- (a) The professor's interpretation involves direct causation while the TA's interpretation involves indirect causation
 - (b) The professor's interpretation involves indirect causation while the TA's interpretation involves direct causation
 - (c) The professor's interpretation involves direct causation while the TA's interpretation involves reverse causation
 - (d) The professor's interpretation involves reverse causation while the TA's interpretation involves direct causation
 - (e) The professor's interpretation involves reverse causation while the TA's interpretation involves indirect causation
12. [3] A professor will select two students to debate each other in Monday's lecture. Her class of 20 has 12 female students and 8 male students. The probability that at at least one of the two students chosen is female is closest or equal to.
- (a) 0.8316
 - (b) 0.8400
 - (c) 0.8526
 - (d) 0.8600
 - (e) 0.8643
13. [3] Economics Ph.D. students sit a comprehensive exam at the end of their first year of study. They have only two chances to pass the exam. Suppose that 55 percent of students pass on their first attempt. Of those that do not pass the first attempt, suppose that 75 percent pass on their second attempt. The probability that a randomly selected student will take the exam twice and pass on their second try is closest or equal to:
- (a) 0.3375
 - (b) 0.3624
 - (c) 0.4125
 - (d) 0.4625
 - (e) 0.8625
14. [3] Your friend claims that $A = (A \cap B^c) \cup (A \cap B)$. Which of the following is most accurate. This statement is
- (a) Always True
 - (b) Always False
 - (c) False unless A and B are mutually exclusive
 - (d) False unless A and B are independent
 - (e) False unless $A = B^c$ and $B = A^c$.

15. [3] Let D be the set defined by

$$D = A \cap B^c$$

and F be the set defined by

$$F = A \cap B$$

- . Which of the following is the most accurate statement:
- independent, but not necessarily mutually exclusive or complements
 - mutually exclusive, but not necessarily compliments or independent
 - complements, but not necessarily mutually exclusive or indepent
 - complements and mutually exclusive, but not independent.
 - independent and complements, but not necessarily mutually exclusive
16. [3] A class of just three students took a final exam. The class average was 70. The first student obtained a 64. The second student obtained a 72. What did the third student obtain?
- 66
 - 68
 - 72
 - 74
 - 76
17. [3] In a class of three students, none of the students scored below the class average of 75. Which of the following **MUST** be true about the exam scores?
- The histogram is positively skewed
 - The hisogram is negatively skewed
 - The variance is zero
 - The mean lies strictly above the median
 - The mean lies strictly below the median.
18. [3] Suppose that 75 percent of students who go to the University of Guelph report being happy with their choice of University, whereas only 65 percent at other Ontario Universities report being happy with their choice. If University of Guelph student body comprises 15 percent of the University students in Ontario, then the percent of all Ontario University students that are happy with their choice is closest or equal
- 66.50 percent
 - 67.75 percent
 - 68.25 percent
 - 68.75 percent
 - 70 percent

19. [3] Continue with the same information as in Question 18. Out of all the students that are happy with their choice university in Ontario, the percent that attend the University of Guelph is closest or equal to:
- (a) 15 percent
 - (b) 16.36 percent
 - (c) 16.61 percent
 - (d) 16.92 percent
 - (e) 75 percent
20. [3] There are 200 bicyclists in a long distance bike race. The time to completion will be recorded for each bicyclist. The number of bicyclists who
- (a) No more than 50 can place more than two standard deviations away from the mean and no more than 22 can place 3 more than standard deviations away from the mean.
 - (b) No more than 150 can place more than two standard deviations away from the mean and no more than 177 can place 3 more than standard deviations away from the mean.
 - (c) No less than 50 can place more than two standard deviations away from the mean and no less than 22 can place 3 more than standard deviations away from the mean.
 - (d) No less than 150 can place more than two standard deviations away from the mean and no less than 177 can place 3 more than standard deviations away from the mean.
 - (e) It is impossible to answer this question unless we know that the histogram has a bell-shaped distribution.

END OF EXAM

End of examination

Total pages: 9

Total marks: 81