

TRENT UNIVERSITY, WINTER 2018

MATH-CCTH 1080H Test #2

~~Tuesday, 13~~ Friday, 16 March*Time: 60 minutes*

Name: _____ Practice Test #2 _____

STUDENT NUMBER: _____ 0123456 _____

Question	Mark
1	_____
2	_____
3	_____
Total	_____ /30

Instructions

- *Show all your work.* Legibly, please!
- *If you have a question, ask it!*
- Use the back sides of the test sheets for rough work or extra space.
- You may use a calculator and an aid sheet.

1. Do any *two (2)* of **a-c**. [$10 = 2 \times 5$ each]
- a.** A card is drawn at random from a standard deck and replaced before the experiment is repeated. What is the expected number of \diamond s in five such draws?
- b.** A fair standard die is rolled once and the random variable Y gives the number of the face that came up. Compute the expected value $E(Y)$ and variance $V(Y)$ of Y .
- c.** The continuous random variable X has $f(x) = \begin{cases} 1+x & -1 \leq x \leq 0 \\ 1-x & 0 \leq x \leq 1 \\ 0 & x < -1 \text{ or } x > 1 \end{cases}$ as its probability density function. What is the expected value of X ?

2. Do *all three* (3) of **a–c**.

Consider the following data: 2, 1, 5, 2, 6, 3

- a. Find the mean, median, and mode of the given data. [3]
- b. Find the standard deviation of the given data. [4]
- c. Suppose the data gives the faces that came up in six rolls of a die. Can you determine whether the die is likely to be biased? Explain why or why not as best you can. [3]

3. Do *one* (1) of **a** or **b**. [10]

- a.** Rent University is a federation of three colleges, Complain College, Growly College, and Ought-Not-To-Be College. Each college pays rent to the university [hence the name!] for the use of the university's facilities at a rate of 4000 per student. The colleges, however, charge different amounts for tuition and what they actually get from each student varies due to scholarships, bursaries, whether students are from another province, and so on. The colleges' overall situations are as follows:

<i>College</i>	<i>Students</i>	<i>Total Income</i>
Complain	120	450,000
Growly	100	410,000
Ought-Not-To-Be	80	400,000

What is the average income per student for each college and for Rent University as whole? Determine whether each college and the university as a whole are making or losing money, and just how much.

- b.** You go to Tim Horton's to get two coffees at 3 a.m. because you need to study hard for your math test. The terribly bored staff prepare three sets of two coffees for you and tell you that one set has two Roll Up The Rim winners, one has a winner and a loser, and one has two losers, but give no indication which is which. You pick one of the sets of two coffees at random. After finishing your first coffee you check the rim and discover that you have a winner. What is the probability that your second coffee is also a winner?

[Total = 30]