

TRENT UNIVERSITY, WINTER 2018

MATH-CCTH 1080H Test #1

Tuesday, ~~6~~ Friday, 9 February*Time: 60 minutes*

Name: _____ Practice Test _____

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. Fill in the blanks: *i.* 5 is to 4 as ___ is to 52. *ii.* ___ is to 2.1 as 6 is to 9.
iii. 3 is to ___ as 48 is to 40. *iv.* 19 is to 4.75 as 2.2 is to ___.
v. 81 is to ___ as ___ is to 1. [Same number in both blanks!]
 - b. If a *zap* is 17 *tingles* and a *tingle* is 13 *shivers*, how many *zaps* are there in 41.99 *shivers*?
 - c. Suppose a fair coin is tossed until it comes up heads. What is the probability that no less than three and no more than six tosses will be required?

- 2.** Do any *two* (2) of **a–c**. [$10 = 2 \times 5$ each]
- a.** If the speed of light in a vacuum is 300,000,000 metres per second, what is it in kilometres per hour?
 - b.** How many ways that can be told apart are there to arrange the letters in the word “unusual” if copies of the same letter can’t be told apart?
 - c.** A fair coin is tossed four times. What is the probability that at least two heads will come up?

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

- a.** One of our few sources for the life of the mathematician Diophantus (*c.* 250 A.D.) is a puzzle given in an anthology by a Fifth Century writer named Metrodorus:

‘Here lies Diophantus,’ the wonder behold.
Through art algebraic, the stone tells how old:
‘God gave him his boyhood one-sixth of his life,
One twelfth more as youth while whiskers grew rife;
And then yet one-seventh ere marriage begun;
In five years there came a bouncing new son.
Alas, the dear child of master and sage
After attaining half the measure of his father’s life
chill fate took him.
After consoling his fate by the science of numbers
for four years, he ended his life.’

According to the riddle, how old was Diophantus when he died?

- b.** A very special island is inhabited only by knights and knaves. Knights always tell the truth, and knaves always lie. You meet two inhabitants: Zed and Zoey. Zed says that it’s false that Zoey is a knave. Zoey claims, “Zed and I are different.” Determine who is a knight and who is a knave. Please give your reasoning.

[Total = 30]