

## Mathematics 1550H – Introduction to probability

TRENT UNIVERSITY, Summer 2013

### Practice Test

Time: 60 minutes

#### 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.
- You need not simplify numerical answers unless it's easy to do ...

1. Do any *three (3)* of **a–d**. [ $12 = 3 \times 4$  each]

- The letters in the word “made” are rearranged randomly. What is the probability that the a and the d end up next to each other?
- Let  $X$  be the number of times a fair coin is tossed until it comes up heads for the first time. Compute  $E(X)$ .
- A number is chosen at random from the set  $\{1, 2, \dots, 100\}$ . What is the probability that it is not divisible by 3 or 4?
- A fair die is rolled twice. Let  $A$  be the event that it came up 4 on the second toss and let  $B$  be the event that the sum of the two rolls is even. Determine whether  $A$  and  $B$  are independent or not.

2. Do any *one (1)* of **a** or **b**. [ $8 = 1 \times 8$  each]

- Two cards are drawn at random, one at a time and without replacement, from a standard 52-card deck. What is the probability that the second card is a diamond?
- Six individual socks are taken randomly out of a drawer than contains ten distinctive pairs of socks; let  $X$  be the number of pairs among the six individual socks. Find the mass probability function of  $X$ .

3. Do any *two (2)* of **a–c**. [ $10 = 2 \times 5$  each]

- Suppose  $A$  and  $B$  are two events and  $D = (B^c A) \cup (A^c B)$ . Explain why  $P(D) = P(A) + P(B) - 2P(AB)$ .
- A fair die is tossed five times. What is the probability that the outcome of the fifth toss is different from all of the previous four tosses?
- Seven cards are drawn at random from a standard 52-card deck. If exactly three of the seven are clubs, what is the probability that at least one of the other four is a heart?

[Total = 30]