DISCRETE MATH[1] W3203 Quiz 2

open book

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Your Name (2 pts for LEGIBLY PRINTING your name on this line)

Problem	Points	Score
your name	2	
1	13	
2	20	
3	20	
4	10	
5	20	
6	15	
Total	100	

SUGGESTION: Do the EASIEST problems first!

HINT: Some of the solution methods involve highschool math as well as new methods from this class.

[1] An example of the Reasonable Person Principle: A reasonable student expects to lose a lot of credit for neglecting to EXPLAIN an answer. Omit explanations at your own risk.

1 (13 pts). You have infinitely many 3.5¢ stamps and 6.5¢ stamps. Prove that you can make any integer postage of at least 35¢.

2 (20 pts). Let T be the set of all bitstrings with the same number of 0's as 1's. We recursively define the set S of bitstrings:

B. $\lambda \in S$

R. If $x, y \in S$, then

(1) $0x1 \in S$; (2) $1x0 \in S$; (3) $xy \in S$.

Prove that $T \subseteq S$.

3 (20). Let S be the set of 6-digit decimal strings 000000 to 999999.

3a (10) How many strings in S use only two different digits?

3b (10) How many strings in S use three, four, or five different digits?

4 (10pts). M&M candies come in red, blue, yellow, and green. In how many ways can you select a bag of 20 M&M's? (Order of selection does not matter.)

5a (15 pts) Jessica tosses a fair coin three times. Joshua also tosses a fair coin three times. What is the probability that they both tossed the same number of heads?

5b (5 pts) Given that they both toss the same number of heads, what is the probability that it is exactly one head?

6 (15 pts). A tetrahedral (i.e., 4-sided) die is marked with 1, 2, 3, and 4 spots on its four sides. It is loaded so that pr(j) = (5-j)/10.

6a (5 pts). Calculate the expected value of a roll of this die.

6b (10 pts). Calculate the standard deviation.