THE UNIVERSITY OF BRITISH COLUMBIA

Math 414 Section 101

Homework 2

Due by 1pm on September 20, 2019

1. A hotel owner avoids room numbers that include the string "13". For example, he doesn't number any room 213 or 1395. The first room is numbered 101 and the other rooms are given increasing consecutive numbers, with the unlucky numbers containing 13 skipped. The last room is numbered 2019. How many rooms are in the hotel?

2. Sarah pours four ounces of coffee into an eight ounce cup and four ounces of cream into a second cup of the same size. She then transfers half the coffee from the first cup to the second, and after stirring thoroughly, transfer half the liquid in the second cup back to the first. What fraction of the liquid in the first cup is now cream?

3. Mark has a bag that contains 3 black marbles, 6 gold marbles, 2 purple marbles and 6 red marbles. Mark adds a number of white marbles to the bag and tells Susan that if she now draws a marble at random from the bag, the probability of it being black or gold is 3/7. How many white marbles does Mark add to the bag?

4. Alex has 75 red tokens and 75 blue tokens. There is a booth where Alex can give two red tokens and receive in return a silver token and a blue token, and another booth where Alex can give three blue tokens and receive in return a silver token and a red token. Alex continues to exchange tokens until no more exchanges are possible. How many silver tokens will Alex have at the end?

5. Invent a grade 11-12 workshop problem and write out a detailed solution for someone giving a workshop. Take as inspiration some UBC Grade 11-12 workshop problem from 2009-2010.

Note: Please make a photocopy or handwritten copy of the problem and solution you create in question 5 and hand it in at the same time as the homework.