Quiz 1

MACHINE LEARNING, SUMMER 2019

Name: UID:

Problem 1.(2 =.5+.5+1 points.)

1a. Let say $\boldsymbol{x} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}$ be a vector containing n observations and $\mathbf{1} = \begin{bmatrix} 1 \\ 1 \\ \vdots \\ 1 \end{bmatrix}$ be vector of ones of size n. is mean of $x_1, \cdots, x_n$ is given by $\boldsymbol{x}^T\mathbf{1}$? (True/False)

1b. What is the support of binomial random variable with parameters N(Total trials) and p (probability of success). Recall by support, we mean the values taken by a random variable.

1c. Let say $\boldsymbol{D} = \begin{bmatrix} \boldsymbol{a}_1, \boldsymbol{a}_2, \cdots, \boldsymbol{a}_k \end{bmatrix}$ be the matrix with k columns $\boldsymbol{a}_i$ for $i \in \{1, \cdots, k\}$. Let $\boldsymbol{x} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}$ be a vector. Write the expression for $\boldsymbol{Dx}$(Matrix, vector product) using $\boldsymbol{a}_i$ (columns of matrix) and x_i(coordinates of vector $\boldsymbol{x}$).

Problem 2.(1.5= .25+.25+.25+.25+.25+.25 points) Using bayes rules write, right hand side of conditional probability $P(\boldsymbol{X}|\boldsymbol{\theta})$. Also, using arrows highlight posterior probability, likelihood and prior terms.

P($\boldsymbol{X}|\boldsymbol{\theta}$)=