

MATH 3160 - Probability - Fall 2017
Extra quiz problems October 1, 2017

- (1) Suppose that, among T families, D of families own a dog, C of families own a cat, and N of the families own neither. How many families own both a cat and a dog? What is the probability to own both a cat and a dog, if a family is chosen at random?
- (2) A family is chosen at random among the same T families as in the previous problem, and found to have a dog. What is the probability they also own a cat?
- (3) In a multiple choice test, a student either knows the answer to a question or gives a random answer. Each question has m possible answers, and the student knows the answer to a question with probability p . Find the probability that the student knows the answer to a question, given that the answer was correct.

Suppose that

- a flu test (correctly) indicates the presence of the flu TPR of the times when the patient actually has the flu (*this is called the true positive rate*);
- the same test (incorrectly) indicates the presence of flu FPR of the times when flu is not actually present (*this is called the false positive rate*);
- currently r is the rate of the flu in the population.

- (4) For a random person, what is the probability that the flu test is positive?
- (5) Calculate the probability that a random person actually has the flu, given that the flu test is positive.
- (6) Car types $C1, C2, C3$ are bought in numbers $N1, N2, N3$ and have accident rates $R1, R2, R3$ respectively. Given an accident, what is the probability that the car type $C1$ is involved?