Term Test A

(1) [6 points] What is the mean and what is the median population of a Canadian province/territory? These are the population numbers in 1000s (census 2011):

Newfoundland and Labrador	515
Prince Edward Island	140
Nova Scotia	922
New Brunswick	751
Quebec	7903
Ontario	12852
Manitoba	1208
Saskatchewan	1033
Alberta	3645
British Columbia	4400
Yukon	34
Northwest Territories	41
Nunavut	32

(2) [6 points] The father of modern sociology, Émile Durkheim, became famous for a study on suicide rates in Catholic and Protestant countries. Even though you would not be able to predict suicide for individuals or small groups, on a population level suicide rates are remarkably stable. Durkheim claimed that the suicide rate is significantly lower in Catholic populations than in Protestant populations. Let's assume the suicide rate for Catholics in a given country and a given year is 0.015% and the suicide rate for Protestants is 0.04%. If this country is predominantly Catholic (85%), with 15% Protestants, then what is the probability that a person who has committed suicide that year is Catholic?

(3) [6 points] In bag A, there are 4 yellow and 3 green tokens. In bag B, there are 2 yellow and 5 green tokens. You toss a coin, for which the probability of heads is 2/3 and the probability of tails is 1/3. If you toss heads, you draw a token from bag A. If you toss tails, you draw a token from bag B. What is the probability that you draw a yellow token?

(4) [4 points] Events X and $\neg Y$ are independent. Their joint probability is 0.18. If $P(Y) = 0.4$, then what is $P(X)$?

(5) [6 points] Events A and B are disjoint. If $P(A) = 0.2$ and $P(B) = 0.4$, then what is $P(\neg A \cup \neg B)$?

(6) [4 points] How many ways are there to draw samples of 5 persons from a population of 8 persons (order does not matter)?

(7) [6 points] Mother paints 60% of her Easter eggs green and 40% in other colours. Father paints 35% of his Easter eggs green and 65% in other colours. There are one hundred eggs, 62 of which were painted by Father; the others by Mother. If you find a green egg, what is the probability that it was painted by Mother?