Calculus II - Quiz 4

Please show all your work! Answers without supporting work will not be given credit. Do not simplify your answers.

(1) (10 points) Suppose 6 cards are drawn at random from a deck of 52 cards, find the number of ways of getting

   (a) all cards of different values, such as 234567

   (b) all cards of the same suit

   (c) 4 of a kind and a pair, such as 777744

   (d) two 3 of a kind, such as 222KKK

   (e) 3 different pairs, such as 223344

(2) (10 points) Roll a fair die twice. Consider the following events

$$A = \text{both the numbers are the same}$$
$$B = \text{at least one of the two numbers is a 3}$$

   Find $P(A|B)$ and $P(B|A)$. Are A and B independent?

(3) (10 points) A loaded die has a probability 0.5 of rolling a 1 and 0.1 of rolling each of the other five numbers.

   (a) You roll the loaded die thrice and record the sum of the three numbers. What is the probability that the sum is equal to 4?

   (b) You roll the loaded die until the first time a 1 or a 2 appears. Find the probability that you need more than 10 rolls.

(4) (10 points) You toss a coin 3 times. Consider a random variable X which is equal to the absolute value of the difference between the number of heads and the number of tails.

   Find the (a)probability mass function, (b)mean, (c)variance, and (d)standard deviation of X.