

Use the pdf problem set posted to the website whenever DMC is referred, as the numbering differs from that of the text. Show your work and explain your reasoning.

Practice

1. DMC 18.6
2. DMC 18.7
3. DMC 19.1
4. DMC 20.1

Recitation Lab (TA will work these out in lab)

1. Assume you have a biased coin such that probability of heads= $1/3$. Let X be the random variable that gives the number of heads. Y is the random variable that is 1 if there are 2 heads in a row. Find the joint X - Y pdf and the marginal pdfs for X and Y .
2. There is a chess game tournament played between player p_1 and p_2 . X is the random variable that represents the number of matches played. Each match is independent and player p_1 has $2/3$ probability of winning; player 2 has $1/3$ probability of winning. If the tournament ends after 5 matches what is $P(X=5)$.
3. DMC 18.33 (a) (p) (q)
4. DMC 18.20 (a)
5. What is the probability of getting a heads after flipping a coin at least 5 times?
6. If a pair of dice is rolled, calculate the expected sum if its known that the sum is at least 5.

Problems to hand in:

1. (20 points) DMC 18.33 (l) (m) (o)
2. (10 points) DMC 19.12
3. (20 points) DMC 20.11
4. (10 points) A popular brand of a freezer is available in 3 different rated capacities: 16 ft^3 , 18 ft^3 and 20 ft^3 . Let X be the rated capacity of this brand of freezer sold at a certain store. The probability function for X is given in the following table:

x	16	18	20
p(x)	.2	.5	.3

- a. Find $E(X)$ and $V(X)$.
- b. If the price of the freezer having capacity X is $70X-650$ what is the expected price paid by the next customer?
5. (10 points) The probability that a 0 bit is generated is 0.8 and the probability that 1 bit is generated is 0.2. What is the probability that exactly eight 0 bits are generated when 10 bits are generated? Each bit generation is independent.
6. (20 points) An electronics retailer has purchased three computers of a certain type at \$500 apiece. It will sell them for \$1000 a piece. The manufacturer has agreed to repurchase any computers still unsold after a specified period at \$200 apiece. Let X

denote the number of computers sold, and suppose that $p(0) = .1$, $p(1) = .2$, $p(2) = .3$ and $p(3) = .4$.

Let $h(X)$ denote the profit associated with selling X units, the given information implies that $h(X) = \text{revenue} - \text{cost}$ OR $h(X) = 1000X + 200(3 - X) - 1500$. Calculate the expected profit. What is the Variance of X ?

7. **(10 points)** The CS department lab has 6 computers to be used by students. X is the number of computers used during a particular time of the day, the pdf for X is given here:

x	0	1	2	3	4	5	6
P(X=x)	0.05	0.10	0.15	0.25	0.20	0.15	0.10

Answer the following:

- What is the probability that at most 2 computers are in use?
- What is the probability that the number of computers in use is strictly between 2 and 5?