MATH 3332, Homework Assignment 2

This HW is due on 6/30 at 12:01PM. Details instructions about how to submit your solutions with be given shortly in a nother file.

Problems:

1. The random variable X has range $\{1, 2, 3, 4\}$. The pmf of X is

$$f(1) = 0.1,\ f(2) = 0.3,\ f(3) = 0.2,\ f(4) = 0.4.$$

   (a) Find $Var(X)$.

   (b) Find the mgf of X.

2. Let the experiment be the toss of seven dice in a row.

   Let X_i be the outcome of the i-th die, $i = 1, 2, \cdots, 7$.

   Suppose $x_1 = 4$, $x_2 = 3$, $x_3 = 1$, $x_4 = 2$, $x_5 = 4$, $x_6 = 1$, $x_7 = 6$.

   (a) Find $\bar{x}$

   (b) Find s^2.

3. The random variable X has the mgf

$$M(t) = (1 - 5t)^{-1}.$$

   Find $Var(X)$.

4. Ten coins are tossed in a row. Let X be the number of coins that turn up heads in this experiment. Find $P(X = 6)$.

5. A coin is tossed repeatedly until five heads are observed. (The five heads are not necessarily consecutive.) Let X be the number of tosses. Find $P(X = 8)$.

6. Suppose that $X \sim$ Poisson(3). Find $P(X = 3)$.

7. X is a continuous random variable with pdf

$$f(x) = \frac{x^2}{9}, \quad 0 < x < 3.$$

   (a) Find $F(x)$, the cdf of X.

   (b) Find $P(1 < X < 2)$.

   (c) Find $P(X > 1 \,|\, X < 2)$.

8. Y is a continuous random variable with pdf

$$f(y) = \frac{y^2}{9}, \quad 0 < y < 3.$$

(a) Find $E(Y)$.

(b) Find $E(Y^2)$.

(c) Find $Var(Y)$.

9. X and Y are discrete random variables with joint pmf

	$X = 1$	$X = 2$	$X = 4$
$Y = 1$	0.5	0.1	0
$Y = 3$	0	0.2	0.2

Find the marginal distribution of X.