Exercise 4

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1. For a discrete random variable X the cumulative distribution function F(x) is as shown:

x	1	2	3	4	5
F(x)	0.2	0.32	0.67	0.9	1

Find (a)P(X=3), (b) $P(X > 2)$

2. X and Y are independent random variables such that
E(X)=10, Var(x)=2, E(Y)=8, Var(Y)=3.
Find;
a.E(5X+4Y)
b.Var(5X+4Y)
c.$Var(\frac{1}{2}X - Y)$
d.$Var(\frac{1}{2}X + Y)$

3. A bag contains five black counters and six red counters. Two counters are drawn, one at a time and not replaced. Let X be " the number of red counters drawn". Find E(X).

4. The discrete random variable X has the following probability distribution

x	0	1	2	3	4
P(X=x)	0.20	0.20	0.20	0.20	0.20

a. Write down the name of the distribution of X.
b. Find $P(0 \leq X < 2)$
c.$E(x)$
d.$E(X^2 + 3X)$

$$5..f(x) = \begin{cases} k(x+2)^2 & -2 \leq x < 0 \\ 4k & 0 \leq x \leq \frac{4}{3} \\ 0 & otherwise \end{cases}$$

a. find the value of k.
b. sketch y=f(x)
c. find $P(-1 \leq x \leq 1)$ d. Find $P(X > 1)$
e. find the mean and the standard deviation

6. Let the pmf of a r.v X be given by ;

$$f(x) = \begin{cases} \frac{x^2+1}{18} & x = 0, 1, 2, 3 \\ 0, & elsewhere \end{cases}$$

Detremine the pmf of $Y = X^2 + 1$

7. A r.v X has pdf

$$f(x) = \begin{cases} e^{-x}, & x \geq 0 \\ 0, elsewhere \end{cases}$$

Determine the pmf of $Y = X^4$