Mathematical Expectation

1. A random variable X has the following probability distribution.

No. of calls (X)	-2	-1	0	1	2	3
P(x)	0.1	k	0.2	2k	0.3	k

Find the value of k and calculate mean and variance of the distribution. Also find E(2X+5) and V(2X + 5).

2. Find the expected selling prices, variance and standard deviation of a product on Kathmandu city in a study of sales.

Selling Prices Rs.	50	55	60	75	90
No. of customers	5	20	18	20	37

Also verify that expected value is equal to its mean.

3. In a business venture a man can make a profit of Rs. 50000 or incur a loss of Rs. 20000. The probability of making profit or incurring loss from the past experience is known to be 0.75 and 0.25 respectively. What is the expected profit and coefficient of variation.

4. A random variable X is defined to be the larger of the two values when the dice are thrown; or the values if the values are the same. Find;

a) E(10X+5)
b) $E(X^2)$
c) Standard Deviation of X
d) Coefficient of variation of X
e) V (10X+5)

5. The owner of a used-car business knows from previous experience that the number of cars sold in any given week has the following probability distribution.

Car-sales per week	0	1	2	3+
Probability	0.35	0.30	0.25	0.10

a) What is the probability of 1 or 2 cars being sold in a given week?
b) What is the probability that no more than two cars will be sold in a given week?
c) What is the probability that at least one car will be sold in a given week?
d) Determine the expected value and standard deviation for the distribution.
e) How many cars can the owner expected to sell in a 10-week period?
f) Assume the owner makes Rs. 900 profits on each car sold and that has fixed weekly overhead costs of Rs. 300 (rent, heating, insurance, etc.) Determine his expected weekly profit and standard deviation.