

**TMA1201 Tutorial 12 -
T9.2 Discrete random variable**

1. A mail order computer business has six telephone lines. Let X denotes the number of lines in use at a specified time. Suppose the pmf of X is as given in table below

x	0	1	2	3	4	5	6
$p(x)$	0.10	0.15	0.20	0.25	0.20	0.06	0.04

Calculate the probability for each of the following events:

- At most three lines are in use.
 - Fewer than three lines are in use.
 - At least three lines are in use.
 - Between two and five lines, inclusive, are in use.
 - Between two and four lines, inclusive are not in use.
 - At least four lines are not in use.
2. A consumer organization that evaluates new washing machine customarily reports the number of major defects in each machine examined. Let X denotes the number of major defects in a randomly selected machine of a certain type. The cdf of X is as follows:

$$F(x) = \begin{cases} 0 & x < 0 \\ 0.06 & 0 \leq x < 1 \\ 0.19 & 1 \leq x < 2 \\ 0.39 & 2 \leq x < 3 \\ 0.67 & \text{for } 3 \leq x < 4 \\ 0.92 & 4 \leq x < 5 \\ 0.97 & 5 \leq x < 6 \\ 1 & 6 < x \end{cases}$$

Calculate the following probabilities directly from the cdf:

- $P(X = 2)$
 - $P(X > 3)$
 - $P(2 \leq X \leq 5)$
 - $P(2 < X < 5)$
3. At a particular time, a chemical supply company keeps a stock of 200lb of methyl chloride. It sells the substance in 10-lb per bottle and assumed the number of bottles X is a random variable with pmf as follows:

x	1	2	3	4
$p(x)$	0.4	0.2	0.1	0.3

Compute $E[X]$ and $V[X]$. Also estimate the variance of the substance left.