

Seminar 16 (Suggested Solution)

1. X : Discrete Y : Continuous M : Continuous N : Discrete P : Discrete

2.

Sample Space	w
HHH	3
HHT	1
HTH	1
THH	1
HTT	-1
THT	-1
TTH	-1
TTT	-3

3. We can select x defective sets from 2 in ${}_2C_x$ ways, and select (3-x) good sets from 5 in ${}_5C_{(3-x)}$ ways. So we can select the 3 sets in ${}_2C_x {}_5C_{(3-x)}$ ways. And the total possible outcomes = ${}_7C_3$.

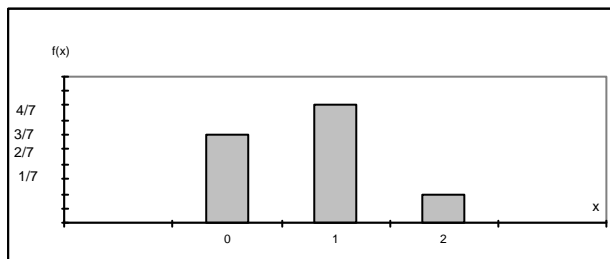
Therefore, $P(x) = [{}_2C_x {}_5C_{(3-x)}] / {}_7C_3$

For example: $P(1) = [{}_2C_1 {}_5C_{(3-1)}] / {}_7C_3 = {}_2C_1 {}_5C_2 / {}_7C_3 = (2)(10) / 35 = 4/7$

In tabular form,

x	0	1	2
P(x)	2/7	4/7	1/7

The probability distribution:



4.

$$F(x) = \begin{cases} 0 & \text{for } x < 0 \\ 2/7 & \text{for } 0 \leq x < 1 \\ 6/7 & \text{for } 1 \leq x < 2 \\ 1 & \text{for } x \geq 2 \end{cases}$$

- a) $P(X=1) = P(X \leq 1) - P(X \leq 0) = 6/7 - 2/7 = 4/7$
- b) $P(0 < X \leq 2) = P(X \leq 2) - P(X \leq 0) = 1 - 2/7 = 5/7$

5.

- a) $P(T=5) = F(5) - F(4) = 3/4 - 1/2 = 1/4$
- b) $P(T > 3) = 1 - F(3) = 1 - 1/2 = 1/2$
- c) $P(1.4 < T < 6) = F(5) - F(1.4) = 3/4 - 1/4 = 1/2$
- d)

