

Assignment 4.1

Given Data:-

x	0	1	2	3
P(x)	0.2	0.1	0.4	0.3

Solution:-

i) $F(2) = 2$

ii) $E(X) = \sum x \cdot P(x)$

x	P(x)	$x \cdot P(x)$	$x^2 \cdot P(x)$
0	0.2	0.0	0
1	0.1	0.1	0.1
2	0.4	0.8	1.6
3	0.3	0.9	2.7
		1.8	$\leftarrow \sum x \cdot P(x)$

$E(X) = 1.8$

iii) $E(2X)$

$= 2 E(X) = 2(1.8) = 3.6$

$E(2X) = 3.6$

iv) $V(X) = E(X^2) - [E(X)]^2$
 $= 4.4 - (1.8)^2$
 $= 4.4 - 3.24 = 1.16$

2) $\rightarrow E(X) = \sum x \cdot P(x)$

x P(x)	x	P(x)	$x \cdot P(x)$	$x^2 \cdot P(x)$ = E(x) <u>Mean</u>
	3	0.03	0.09	0.27
	4	0.05	0.20	0.80
	5	0.07	0.35	1.75
	6	0.10	0.60	3.60
	7	0.14	0.98	6.86
	8	0.20	1.60	12.80
	9	0.18	1.62	14.58
	10	0.12	1.20	12.00
	11	0.07	0.77	8.47
	12	0.03	0.36	4.32
	13	0.01	0.13	1.69

$E(X) = 7.9$ 7.9 ← Mean

$$V(X) = E(X^2) - [E(X)]^2$$

$$= 67.14 - 62.41$$

$V(X) = 4.73$

3) \rightarrow

x	P(x)	(Given Data:-)
-4	0.1	
-2	0.3	
0	k	
2	0.3	
4	0.1	

Sum of

a) → As Probability is equal to 1

$$\therefore 0.1 + 0.3 + k + 0.3 + 0.1 = 1$$

$$[k = 0.2]$$

X	X	P(X)	
-4	-4	0.1	
-2	-2	0.3	
0	0	0.2	← k (Found)
2	2	0.3	
4	4	0.1	

$$\begin{aligned} b) \rightarrow E(X) &= \sum x \cdot P(x) \\ &= (-4)(0.1) + (-2)(0.3) + (0)(0.2) \\ &\quad + (2)(0.3) + (4)(0.1) \\ &= -0.4 - 0.6 + 0 + 0.6 + 0.4 \\ &= -1 + 1 + 0 \end{aligned}$$

$$[E(X) = 0]$$

$$c) \rightarrow V(X) = E(X^2) - [E(X)]^2$$

$$\begin{aligned} E(X^2) &= \sum x^2 \cdot P(x) \\ &= (+16)(0.1) + (+4)(0.3) \\ &\quad + (0)(0.2) + (4)(0.3) \\ &\quad + (16)(0.1) \\ &= 1.6 + 1.2 + 0 + 1.2 + 1.6 \end{aligned}$$

$$[V(X) = 5.60]$$

d) → standard deviation

$$S.D.(X) = \sqrt{V(X)} = \sqrt{0} = 0$$

$$= \sqrt{5.60} = 2.366$$

e) $E(2x+5)$

$$= 2E(x) + 5$$

$$= 2(0) + 5$$

$$= 0 + 5 = 5$$