230201026
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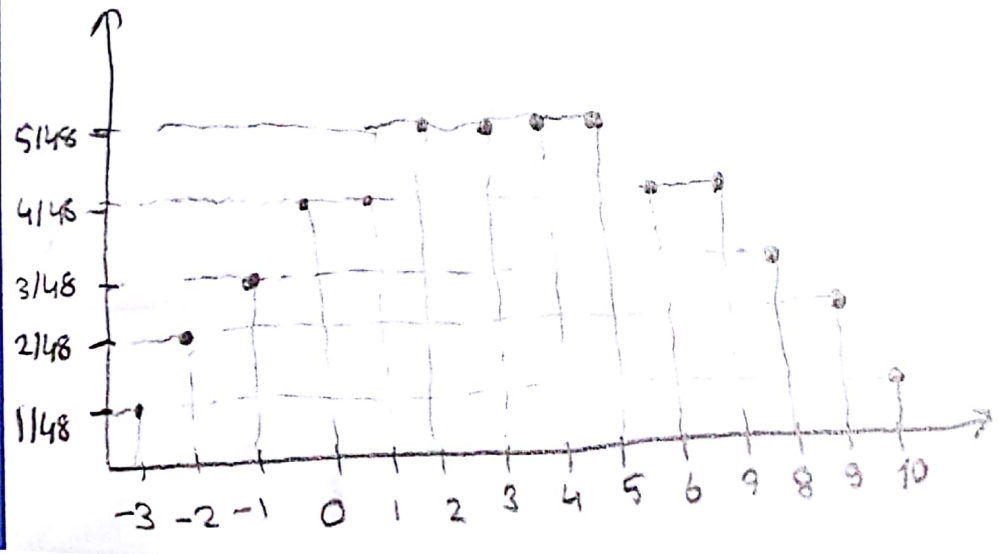
A can be = 1,2,3,4,5,6
B can be = 1,2,3,4
C can be = -1,1
X can be = -3,-2,-1,0,1,2,3,4,5,6,7,8,9,10

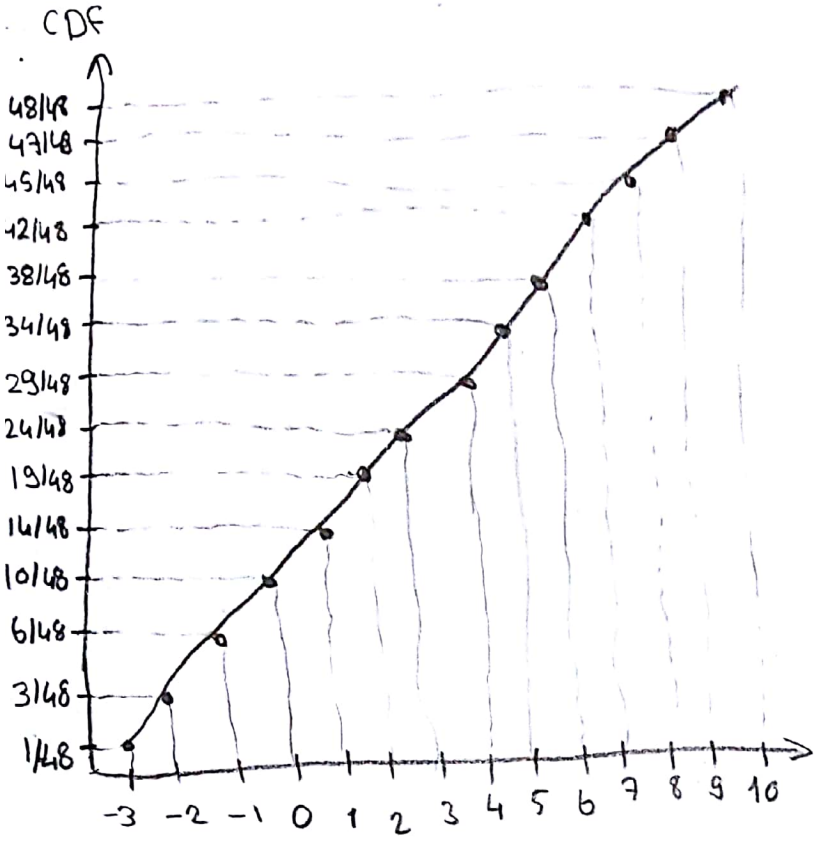
ABC = (1,1,-1) X=0
ABC = (2,1,-1) X=1
" (3,1,-1) "=2
(4,1,-1) =3
(5,1,-1) =4
(6,1,-1) =5
(1,2,-1) =-1
(2,2,-1) =0
(3,2,-1) =1
(4,2,-1) =2
(5,2,-1) =3
(6,2,-1) =4
(1,3,-1) =-2
(2,3,-1) =-1
(3,3,-1) =0
(4,3,-1) =1
(5,3,-1) =2
(6,3,-1) =3
(1,4,-1) =-3
(2,4,-1) =-2
(3,4,-1) =-1
(4,4,-1) =0
(5,4,-1) =1
(6,4,-1) =2

ABC = (1,1,1) X=2
(2,1,1) =3
(3,1,1) =4
(4,1,1) =5
(5,1,1) =6
(6,1,1) =7
(1,2,1) =3
(2,2,1) =4
(3,2,1) =5
(4,2,1) =6
(5,2,1) =7
(6,2,1) =8
(1,3,1) =4
(2,3,1) =5
(3,3,1) =6
(4,3,1) =7
(5,3,1) =8
(6,3,1) =9
(1,4,1) =5
(2,4,1) =6
(3,4,1) =7
(4,4,1) =8
(5,4,1) =9
(6,4,1) =10

X=-3, 1/48 probability
X=-2, 2/48 probability
X=-1, 3/48 probability
X=0, 4/48 probability
X=1, 4/48 probability
X=2, 5/48 probability
X=3, 5/48 probability
X=4, 5/48 probability
X=5, 5/48 probability
X=6, 4/48 probability
X=7, 4/48 probability
X=8, 3/48 probability
X=9, 2/48 probability
X=10, 1/48 probability

PMF





Expected value of X

$$\frac{(-3,1)+(2,2)+(-1,3)+(0,4)+1,4+2,5+3,5+4,5+5,5+6,4+7,4+8,3+9,2+10,1}{48} = \boxed{3,5}$$

Variance of X, for every value from X, We know average = 3,5

-3	3,5+3 = 6,5	42,25	5	3,5-5 = -1,5	2,25
-2	3,5+2 = 5,5	30,25	5	= -1,5	2,25
-2	3,5+2 = 5,5	30,25	5	= -1,5	2,25
-1	= 4,5	20,25	5	= -1,5	2,25
-1	= 4,5	20,25	5	= -1,5	2,25
-1	= 4,5	20,25	6	= -2,5	6,25
0	= 3,5	12,25	6	= -2,5	6,25
0	= 3,5	12,25	6	= -2,5	6,25
0	= 3,5	12,25	6	= -2,5	6,25
0	= 3,5	12,25	6	= -2,5	6,25
0	= 3,5	12,25	7	= -3,5	12,25
1	= 2,5	6,25	7	= -3,5	12,25
1	= 2,5	6,25	7	= -3,5	12,25
1	= 2,5	6,25	7	= -3,5	12,25
1	= 2,5	6,25	8	= -4,5	20,25
1	= 2,5	6,25	8	= -4,5	20,25
2	= 1,5	2,25	8	= -4,5	20,25
2	= 1,5	2,25	8	= -4,5	20,25
2	= 1,5	2,25	9	= -5,5	30,25
2	= 1,5	2,25	9	= -5,5	30,25
2	= 1,5	2,25	10	= -6,5	42,25
2	= 0,5	0,25			
3	= 0,5	0,25			
3	= 0,5	0,25			
3	= 0,5	0,25			
3	= 0,5	0,25			
3	= -0,5	0,25			
4	= -0,5	0,25			
4	= -0,5	0,25			
4	= -0,5	0,25			
4	= 0,5	0,25			
4					

$$\frac{500}{47} = 10,638 = \mathrm{Var}(X)$$

Both expected value and variance is same as it is in the simulation.