* In a game of six faced die is thrown. If 1 or 2 comes the player gets Rs 30, if 3 or 4 the player gets Rs 10. If 5 comes he loses Rs. 30 and in the event of 6 he loses Rs. 100 plot the CDF and PDF of gain or loss.

when throwing a six faced die the sample space is given by

$$S = \{1, 2, 3, 4, 5, 6\} \Rightarrow P(S) = \left\{\frac{1}{6}, \frac{1}{6}, \frac{1}{6}, \frac{1}{6}, \frac{1}{6}, \frac{1}{6}\right\}$$

In this each sample point is having equal probability $= \frac{1}{6}$

Here the random variable X = gain or loss

it is given that.

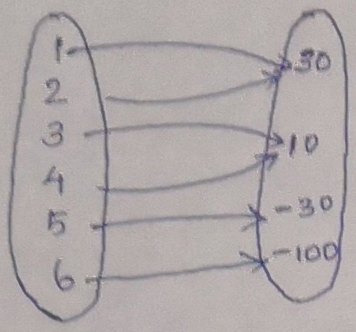
when 1 or 2 comes = gain → Rs 30

3 or 4 comes = gain → Rs 10

5 comes = loss → Rs. 30

6 comes = loss → Rs 100

we can assign these outcomes to real numbers



$S = \{1, 2, 3, 4, 5, 6\}$

$\{30, 30, 10, 10, -30, -100\}$

So the random variable X takes the values

$X = \{-100, -30, 10, 30\}$

$P(X = -100) = P(6) = \frac{1}{6}$

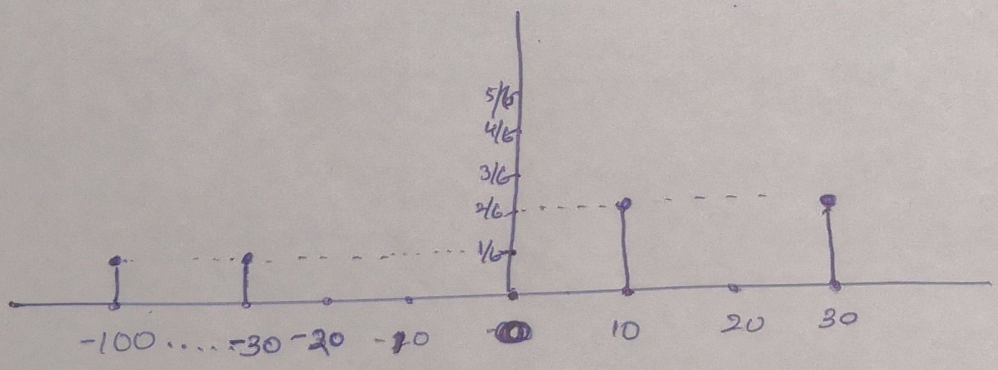
$P(X = -30) = P(5) = \frac{1}{6}$

$P(X = 10) = P(3) + P(4) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6}$

$P(X = 30) = P(1) + P(2) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6}$

Therefore the probability function for discrete random variable X is given below.

X	-100	-30	10	30
$f(x)$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{2}{6}$



PDF

CDF of a discrete random variable at any certain event is equal to the summation of the probabilities of random variable up to that event

$F_X(-100) = \frac{1}{6} \leftarrow P(-100)$

$F_X(-30) = P(-100) + P(-30) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6}$

$F_X(10) = P(-100) + P(-30) + P(10) = \frac{1}{6} + \frac{1}{6} + \frac{2}{6} = \frac{4}{6}$

$F_X(30) = P(-100) + P(-30) + P(10) + P(30)$

$\frac{1}{6} + \frac{1}{6} + \frac{2}{6} + \frac{2}{6} = \frac{6}{6} = 1$