10/27/2016

$T := X_1 + X_2 + \ldots + X_n$

"total r.v."

"sum r.v"

$\bar{X}_n := \frac{T_n}{n} = \frac{X_1 + \ldots + X_n}{n} = \frac{1}{4} \sum_{i=1}^{n} X_i$

$X_1, X_2, X_3 \stackrel{iid}{\sim} \text{Bern}(0.1)$

$T \sim \text{Binomial}(3, 0.1)$

$$T \sim \begin{cases} 0 & \text{wp } 0.729 \\ 1 & \text{wp } .243 \\ 2 & \text{wp } .027 \\ 3 & \text{wp } 0.001 \end{cases}$$

$$\bar{x} = \begin{cases} 0 & \text{wp } 0.729 \\ \frac{1}{3} & \text{wp. } 0.243 \\ \frac{2}{3} & \text{wp. } 0.027 \\ 1 & \text{wp. } 0.001 \end{cases} \qquad \bar{x} := \frac{1}{n}\sum_{i=1}^{n} x_i$$

$x = 5'11''$

X = is a random v. would for elderly height

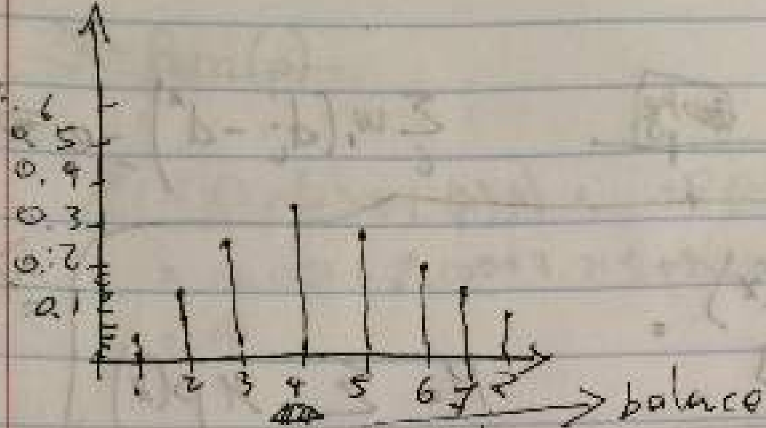
$P(X = 5'11'') =$

$$X \sim \text{Binom}\left(8, \tfrac{1}{2}\right) = \binom{8}{x}\left(\tfrac{1}{2}\right)^{x}\left(1-\tfrac{1}{2}\right)^{8-x}$$

$$= \frac{\binom{8}{x}}{2^8}$$

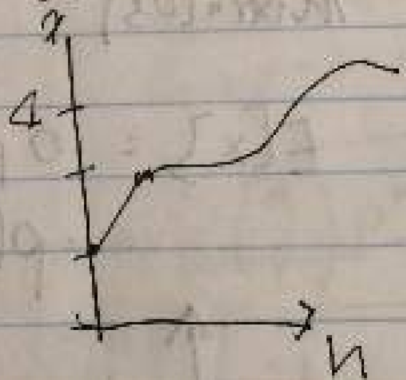
x	$P(x)$	$F(x)$
0	0.004	0.004
1	0.031	0.035
2	0.109	0.145
3	0.219	0.363
4	0.273	0.637
5	0.219	0.858
6	0.109	
7	0.031	0.965
		0.965
8	0.004	0.926
		1

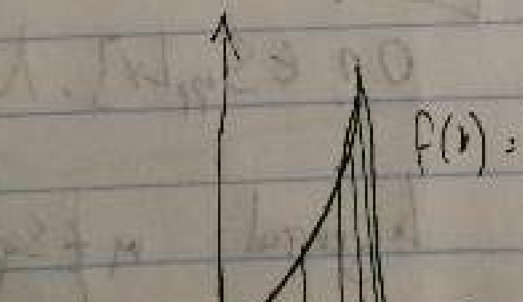
b



n	1	2	3	4	5							
x	2	5	4	4	3	5	4	5	6	5	7	3
$\bar{x}$	2	3.5	$\frac{11}{3}$				3.837					4.429

5 | 5 | 1 | 4 | 3 | 3 | 4





$f(x) = x^2$ $x(6,3)$

$$\int_{\mathbb{R}} f(x)\,dx = 9$$

$\sum_i w_i(d_i - d^*) = 0 \Rightarrow \sum w_i d_i = \sum w_i d^*$

$\Rightarrow d^* = \frac{\sum w_i d_i}{\sum w_i}$

$\mu := \frac{\sum_{x \in Supp[X]} p(x)}{\sum_{x \in Supp[X]} p(x)}$

$\sum_{x \in Supp[X]} p(x) = 1$

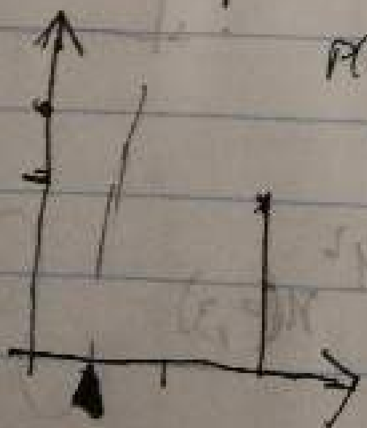
$\mu = \sum_{x \in Supp[X]} x\, p(x)$

Mean
expected value, expectation, first moment

$X \sim Bern(0.3)$

$E[X] = 0\, p(0) + 1\, p(1)$
$= p(1) = 0.3$

$p(1) = \boxed{p}$



Or $\mu \in Supp[X]$. No.

In general $\mu \notin Supp[X]$

~~$X \sim \text{Bern}(p)$~~

$\mu := 0 \cdot p(0) + 1(p)(1) + \ldots + 8p(8)$

$= 0.031 + 2.109 + 3.219 + 4.273 + 5.\ldots 3, \ldots \; 8 \cdot 0.007$

$= 4$

$x \sim \text{Binomial}(n, p)$

$$\mu := \boxed{\sum_{x=0}^{n} x \binom{n}{x} p^x (1-p)^{n-x}}$$

$$\binom{n-1}{x-1}$$

$$= \sum_{x=1}^{n} x \frac{n!}{x!(n-x)!} \cdot p^x (1- \quad = n \sum_{x=1}^{n} \frac{(n-1)!}{(x-1)!(n-x)!}$$

$X \sim \text{Hyper}(n, K, N)$

$$\boxed{\mu : \sum_{x \in \text{Supp}[x]} x \frac{\binom{K}{x}\binom{N-K}{n-x}}{\binom{N}{n}}}$$

$k + m = n - 1$

$k + y = n - 1$

$$= np \sum \binom{m}{y} p^m (1-p)^{n-x}$$

$$= \boxed{np}$$

$= 1$

n							7							14
x	1	2	1	2	2	2	2	2	3	2	1	2	1	2
$\bar{x}$														

$$\mu = \sum_{x \in \operatorname{supp}(X)} \frac{x \binom{K}{x}\binom{N-K}{n-x}}{\binom{N}{n}} = n\frac{K}{N} = 3 \cdot \frac{4}{7}$$