The world of Distribution

Random. 2023/2019 World cup

2011 2015

A B

6 6

7 7

3 3

4 → 2 → 1

4 2 → 1

32

4 4 $\boxed{8 \text{ cups}}$

1
2
3
7
5 . . .

1 → 2
1 → 3

Main Idea of this distribution

A B

Indi Aus Aus

$\boxed{9062395123}$

$\boxed{10}$

P/C

Inf

Diff

Beta/Gamma

How many matches..

1 → 2
1 → 3
1 → 4
1 → 9

8

+2

+1

28

9+8+7+6+5+4+3+2+1

$\Rightarrow \frac{9 \cdot 10}{2}$

$\Rightarrow 45$

$\Rightarrow B(n, p)$

B/P/N/ L/NB.

Binomial.

H, T

Binomial

n times → Head odd ??

$$X \sim B\left(n, p = \frac{1}{2}\right)$$

$$p(x) = {}^nC_x \left(\frac{1}{2}\right)^x \left(\frac{1}{2}\right)^{n-x}$$

$$= {}^nC_x \left(\frac{1}{2}\right)^n \quad x = 0, 1, 2 \ldots n$$

$$p_1 = p(1) + p(3) + p(5) + \ldots$$

$$= \left(\frac{1}{2}\right)^n \left[{}^nC_1 + {}^nC_3 + {}^nC_5 + \ldots\right]$$

$$= \left(\frac{1}{2}\right)^n \left[2^{n-1}\right] = \frac{1}{2}$$

$${}^{10}C_1 + {}^{10}C_2 + \ldots + {}^{10}C_{10} = 2^{10} - 1$$

$${}^{10}C_0 + {}^{10}C_1 + \ldots + {}^{10}C_{10} = 2^{10}$$

$\boxed{\text{BD vs NBD}}$

14th Feb .. 10 → 2

$^{10}C_2$

~~100~~ 10 my
2 sun

4 sues
35

Total time travel

Sues is freedom ...

Th Fri T

Sat ~~first~~ half

Sun Remote

Suff Finite

Necessary vs Sufficient Cond.

a, b

$\boxed{a > b > 0}$

mean val

Necessary

$a = np > 0$ $n > 0$ $p > 0$

$b = npq > 0$ $n > 0$ $p > 0$ $q > 0$

$0 < p, q < 1$ $a, b > 0$

$$\frac{a^2}{a-b} = \frac{n^2p^2}{np - npq} = \frac{n^2p^2}{np(1-q)} = \frac{n^2p^2}{np^2} = n$$

integer

Sufficient

$\boxed{a > b > 0}$

$\frac{a^2}{a-b} \Rightarrow$ Integer

let, $b = af$

$0 < f < 1$

$$n = \frac{a^2}{a-b} = \frac{a^2}{a - af}$$

$$n = \frac{a}{1-f}$$

$$\boxed{a = n(1-f)}$$

$$\boxed{b = af = n f (1-f)}$$

$(0 < q < 1)$

Then $f = q \quad (0 < q < 1)$

$1 - f = 1 - q = p$

$a = n(1-f) = np$

$b = nf(1-f) = npq$

$X \to$ R.V. prob function $\to b(x; n, p)$

Let, $\boxed{Y = \frac{X}{n}}$ be a random variable

$E(Y),\ V(Y) = ??$

If $p(y) = ??$ where $p(y)$ is a prob function..

$X \sim b(x, n, p) \quad f(x) = {}^nC_x\, p^x q^{n-x}$ $\boxed{x = 0, 1, 2, 3 \ldots n}$

$E(X) = np \quad V(X) = npq$

$Y = \frac{X}{n} \quad E(Y) = E\left(\frac{X}{n}\right) = \frac{1}{n} E(X) = \frac{np}{n} = p$

$V(Y) = \mathrm{Var}\left(\frac{X}{n}\right) = \frac{1}{n^2} npq = \frac{pq}{n}$

The distribution function $P(y)$ of Y

$P_Y(y) = P(Y \le y) = P\left(\frac{X}{n} \le y\right) = P(X \le ny)$

$= P(...) \quad (f(0) + f(1) + f(2) + \ldots + f[n(n-1)] + f(ny)$

$$\Rightarrow P_Y(y) = f(0)+f(1)+f(2)+\dots+f[n(y-1)]+f(ny)$$

Now, $P_Y(y-1) = P(Y \le y-1)$

$$= P[X \le n(y-1)]$$

$$= f(0)+f(1)+\dots+f[n(y-1)]$$

$\therefore$ PMF $\longrightarrow$ $p(y) = P(y) - P(y-1)$

$$= f(ny) = {}^{n}C_{ny}\, p^{ny} q^{n-ny}$$

Possible vals $0, \frac{1}{n}, \frac{2}{n}, \dots, 1$

$\boxed{X \sim B(n, p)}$

$E[(1+X)^{-1}] = ?$

$p(x) = {}^{n}C_x\, p^x q^{n-x}$

$$\sum_{x=0}^{n} \left(\frac{1}{1+x}\right) {}^{n}C_x\, p^x q^{n-x} = \sum_{x=0}^{n} \left[\frac{n!}{x!(n-x)!} \cdot \frac{p^x q^{n-x}}{(x+1)}\right]$$

$$= \sum \left[\frac{(n+1)!}{(x+1)!\,(n-x)!} \cdot \frac{p^{x+1} \cdot q^{n-x}}{(n+1)p}\right]$$

$$= \frac{1}{(n+1)p} \sum_{x=0}^{n} {}^{n+1}C_{x+1} \cdot p^{x+1} \cdot q^{(n+1)-(x+1)}$$

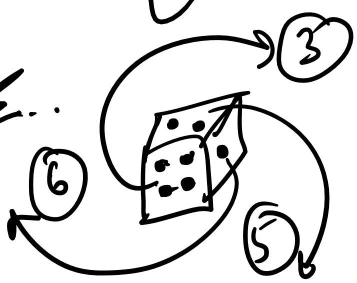
$$= \frac{1}{(n+1)p} \sum_{n=0} \left[{}^{n+1}C_1\, p q^{n+1-1} + {}^{n+1}C_2\, p^2 q^{(n+1)-2} + \dots + {}^{n+1}C_{n+1}\, p^{n+1} q^0 \right]$$

$$= \frac{1}{(n+1)p} \left[(q+p)^{n+1} - {}^{n+1}C_0\, q^{n+1} \right]$$

$$= \boxed{\frac{1 - q^{n+1}}{(n+1)p}}$$

HW $E\left[(1+X)^{-1} (2+X)^{-1} \right]$

ISS Exam...



Regular Die

7 21

$6+5+4+3+2+1$

$\Rightarrow 21$

Prize on 7th throws...

5 or 6

He r needs to draw tot no of throws...

P(B|A) = $Q(\cap)(A|B)$

$\Sigma(A)(A|B)$

$p \Rightarrow$ 5 or 6 $= 2/6 = 1/3$

deter n → so that mode $= 7$

decide n → so mea

let, $(n+1)p = \frac{n+1}{3} = K$ (integer)

mode $K, K-1$

then BD → BT-model

$\boxed{K-1 \le \text{mode} \le K}$ → need to find n in a way

So, $\frac{n+1}{3} - 1 \le 7 \le \frac{n+1}{3}$

$\frac{n-2}{3} \le 7 \le \frac{n+1}{3}$

First part $\boxed{n \le 23}$ Second part $\boxed{20 \le n}$

$\boxed{20 \le n \le 23}$

$n = 21, 22, 23$

@ $n = 23$, $(n+1)p = \frac{24}{3} = 8$

8

7

$n = 21, 22$

$n = 21$

15

They

5700

Hopelessness teaching

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MCQ → 1-60

200

90623-95723

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Class-Reminder for SSC

Mon.

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