07 September 2023 17:45

Binomial Theorem

Binomial Structure

$(a+b)^2 \rightarrow a^2 + 2ab + b^2$

3

$(n+1)$

$(a+b)^n \rightarrow (a^n + {}^nC_1 a^{n-1} b + {}^nC_2 a^{n-2} b^2 + \dots + b^n)$

$(a+b)^0 \rightarrow 1$

9062395123

Life → 10 chances to become Rich

3/4/5/---/9/10

Win/loss

Head | Tail

Success | failure

$(a+b)^n$ $(a-b)^n$

Negative Binomial (-) X

n → H T 5 15th

1

$(x+a)^{-1}$

10 wins

10 heads ..

Success is pre-decided

We need to decide on total trials

In order to get 50 sum → 100 · 50

$n \geq 50$

to $(1 \pm x)^{n}$ $(1-x)^{-n}$

$(2a+3b)^5 = (2a)^5 + {}^5C_1 (2a)^{5-1}(3b)^1 +$

${}^5C_2 (2a)^{5-2}(3b)^2 + \dots + (3b)^5$

CMI

$101^{50} \gtrless 100^{50} + 99^{50}$

$a-b > c$ + sum

$a > b+c$

~~$100^{50} + 99^{50}$~~ → $101^{50} - 99^{50}$

$(100+1)^{50} - (100-1)^{50}$

$\Rightarrow 2\{ {}^{50}C_1 (100)^{49} + {}^{50}C_3 (100)^{47} + \dots \}$

$\Rightarrow 2 \cdot {}^{50}C_1 (100)^{49} + \dots$

$\Rightarrow 100 \cdot 100^{49} + \dots$

$\Rightarrow 100^{50} + ve$

$101^{50} - 99^{50} = 100^{50} + ve$

$101^{50} - 99^{50} > 100^{50}$

$101^{50} > 100^{50} + 99^{50}$

Real Life

JAMAN

Lect ①
Lect ②
Lect 3/4/5/6/7

→ 500 crore

→ 500 hall

$(373)^{16321}$

$(373)^{1}$

$2/_{1}$ = ① 8 9 6

2
4
8
16
32
64
128
256
512
1024
2048
5096

$373^{1} \rightarrow$ ③

$(63813)^{2143444563219836777761873534 5}$

$3^{45} \rightarrow 3^{1} \rightarrow 3$

10"

81

$3^{4,5,6,7,8,\ldots,10"}$ ⇒ ①

$81^{5,6,7,8,\ldots}$ → ① 72 89 45 → 89

11 ☺

Ween
Remind
BP

4 = 2②

16 =

⑧⁴

→ 8 8 ?

8×8 =
8×8 =

CAT
GAUKAN
Chinese
names

$(\ldots 72)^{63^{21}} \to 2^{63} \to 2^{8} \to 8$

$8^{21} \to 8^{1} \to 8 \to 6$

Sup / Inf

max / mini

$y = x + \frac{1}{x}$

Lower Bound

$1 \le x \le 63$

$-20 \le x \le 25$

$-10 \le x \le 123$ UB

$-100 \le x \le 183$

$2 \le x \le 1734$

$3 \le x \le 400$

$15 \le x \le 614$

$x \in N$

$15 < x < 25$

Inf, Sup

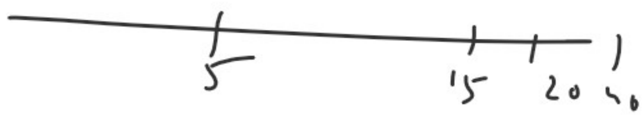
Infimum

$5 < x < 15$

~~$20 < x < 40$~~

$13 < x < 60$

$20 < x < 15$

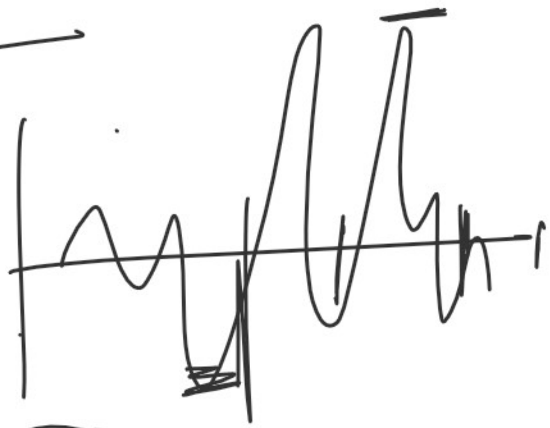


Global wave

Che Guevara

Aleida

Aleida



Rational Terms

$\sqrt{2}$

Positive > 0

Non-negative ≥ 0

n

$(n+1)$

$(1 \quad 1)^{15}$

Positive
Non-negative ≥ 0 $(n+1)$

$\frac{n+1}{n} \Rightarrow \left(1+\frac{1}{n}\right)$

UG

11/12 → 151/PJ7

JEE

$$\left(3^{\frac{1}{5}} + 2^{\frac{1}{3}}\right)^{15}$$

$$T_{r+1} = {}^{15}C_r \left(3^{\frac{1}{5}}\right)^{15-r} \left(2^{1/3}\right)^r$$

$$\Rightarrow {}^{15}C_r \; 3^{3-r/5} \cdot 2^{r/3}$$

$r = 0$

$r = 15$ — 2^{2}

$0 \leq r \leq 15$

$r = 0, 15$

Greatest Coefficient

even

- ${}^nC_{n/2}$
- $\left({}^nC_{\frac{n-1}{2}}\right) \left({}^nC_{\frac{n+1}{2}}\right)$ 7

$$(2x+3y)^7$$

$$^7C_2 (2x)^5 (3y)^2$$

$$^7C_2 \cdot 2^5 \cdot 3^2 \cdot x^5 y^2$$

2

151 $n/2003$

Super HW

$$(1+x)^{2n}$$

If greatest term = greatest coefficient then find range of x.

$y = x_1 + 3x_2 + 9x_3$