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6 बार खुला 2MT.

Q $(3x-y)^5 = \boxed{{}^5C_0(3x)^5(-y)^0} + \boxed{{}^5C_1(3x)^4(-y)^1} + \boxed{{}^5C_2(3x)^3(-y)^2} + \boxed{{}^5C_3(3x)^2(-y)^3} + \boxed{{}^5C_4(3x)^1(-y)^4} + \boxed{{}^5C_5(-y)^5}$

$= 3^5x^5 - 5\cdot(3x)^4y + 10(3x)^3y^2 - 10(3x)^2y^3 + 5(3x)(y)^4 - 1\cdot y^5$

M.T.

Q $(x+y)^4 = \boxed{{}^4C_0(x)^4} + \boxed{{}^4C_1x^3y^1} + \boxed{{}^4C_2x^2y^2} + \boxed{{}^4C_3x^1\cdot y^3} + \boxed{{}^4C_4y^4}$

5 बार खुला

M.T.

Q $(1-2x)^6 = \boxed{{}^6C_0(1)^6(-2x)^0} + \boxed{{}^6C_1(1)^5(-2x)} + \boxed{{}^6C_2(1)^4(-2x)^2} + \boxed{{}^6C_3(1)^3(-2x)^3} + \boxed{{}^6C_4(1)^2(-2x)^4} + \boxed{{}^6C_5(1)^1(-2x)^5} + \boxed{{}^6C_6(1)^0(-2x)^6}$

alternate + -

degree is 6 then No of term = 7

$(r+1)^{th}$ term from Beginning

$= (n-r+1)^{th}$ term from End.

$r+1=3$

$r=2$

3^{rd} term from Beginning

3^{rd} term from End $= (6-2+1)^{th}$ term from Beginning

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Q $(99)^{50} = (100-1)^{50}$

$= {}^{50}C_0 \cancel{100}^{50}(-1)^0 - {}^{50}C_1 100^{49}\cdot(-1)^1 + {}^{50}C_2 \cancel{100}^{48}(-1)^2 - {}^{50}C_3 (100)^{47}(-1)^3 + \dots + {}^{50}C_{\cancel{50}} 100^0\cdot(-1)^{50}$

Q $(101)^{50} = (100+1)^{50}$

$= {}^{50}C_{\cancel{0}} 100^{50} 1^0 + {}^{50}C_1 100^{49}(1)^1 + {}^{50}C_2 \cancel{100}^{48}(1)^2 + {}^{50}C_3 (100)^{47}(1)^3 - - - + {}^{50}C_{\cancel{50}} 100^0\cdot(1)^{50}$

Q $99^{50} + 100^{50} > (101)^{50}$??

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

$100^{50} > 2\{ {}^{50}C_1 100^{49} + {}^{50}C_3 \cdot 100^{47} + \dots \}$

$\cancel{100^{50}} > \cancel{100^{50}} + 2\{ \underbrace{{}^{50}C_3 \dots}\ \}$

$2\{ {}^{50}C_3 + \dots \} < 0$ Nahhhhhhiiii (Wrong Statement)

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$$(x+a)^n = \underbrace{\boxed{{}^nC_0\, x^{n-0} a^0}}_{T_1} + \underbrace{\boxed{{}^nC_1\, x^{n-1} a^1}}_{T_2} + \underbrace{\boxed{{}^nC_2\, x^{n-2} a^2}}_{T_3} + \cdots + \underbrace{\boxed{{}^nC_r\, x^{n-r} a^r}}_{T_{r+1}} + \cdots + {}^nC_n\, x^0 a^n$$

① deg of x is ↓ing.

② deg of a is ↑ing.

③ Sum of deg of x & a is stable $= n$

④ ${}^nC_0, {}^nC_1, {}^nC_2, {}^nC_3 \ldots {}^nC_r \ldots {}^nC_n$ are Bin. Coefficient

*(5) General Term of Expansion $= T_{r+1}$

$$T_{r+1} = {}^nC_r \cdot (\mathrm{I})^{n-r} (\mathrm{II})^r$$

(6) Σ notation of Expansion

$$(x+a)^n = \sum_{r=0}^{n} {}^nC_r \cdot (x)^{n-r} \cdot (a)^r$$

(7) When deg $= n$ then

No of terms $= n+1$

(8) $r+1^{th}$ term from Begining

is $T_{r+1} = {}^nC_r \cdot (x)^{n-r} (a)^r$

(9) $r+1^{th}$ term from End

$= (n-r+1)^{th}$ term from Beginning

(10) Ratio of $\dfrac{(r+1)^{th} \text{ term from Beg.}}{(r+1)^{th} \text{ term from End}} = \left(\dfrac{x}{a}\right)^{n-2r}$

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Proof of 9

$$\frac{(r+1)^{\text{th}} \text{ term from Beginning}}{(n-r+1)^{\text{th}} \text{ term from Beginning}} = \frac{\cancel{{}^{n}C_{r}}\,(x)^{n-r}(a)^{r}}{\cancel{{}^{n}C_{n-r}}\,(x)^{r}(a)^{n-r}}$$

$$= \frac{(a)^{r-n+r}}{(x)^{r-n+r}} = \frac{a^{2r-n}}{(x)^{2r-n}}$$

$$= \left(\frac{a}{x}\right)^{2r-n} = \left(\frac{x}{a}\right)^{n-2r}$$

$T_{r+1} = {}^{n}C_{r} \cdot (x)^{n-r} \cdot (a)^{r}$.

$T_{n-r+1} = {}^{n}C_{n-r} (x)^{n-(n-r)} (a)^{n-r}$

$= {}^{n}C_{n-r} (x)^{r} (a)^{n-r}$.

(10)* If Sum of Coefficient demanded then Put all variable $= 1$

$$\boxed{\begin{array}{l} \text{(11) Middle Term (Depends on } n\text{)} \longrightarrow \begin{cases} n = \text{Even} \quad M.T. = T_{\frac{n+2}{2}} \\ n = \text{odd} \quad M.T. = T_{\frac{n+1}{2}} \ \& \ T_{\frac{n+3}{2}} \end{cases} \end{array}}$$

Q. Find M.T. of $(1-2x)^{6}$

$n = 6$ (Even) 1 M.T.

$T_{\frac{6+2}{2}} = T_4 = {}^{6}C_{3} \cdot (1)^{3} (-2x)^{3}$

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Q Find Ratio of $\boxed{2^{nd}\text{ term}}$ from Beginning & End for $(2+\sqrt{2})^{10}$?

① $r+1=2$

$r=1$

$$\text{Ratio} = \left(\frac{x}{a}\right)^{n-2r} = \left(\frac{1^{st}}{2^{nd}}\right)^{n-2r}$$

$$= \left(\frac{2}{\sqrt{2}}\right)^{10-2\times 1}$$

$$= (\sqrt{2})^{8} = 2^{4} = 16.$$

Q 6^{th} term from Beg. for $(2+\sqrt{2})^{10}$?

$$T_6 = {}^{10}C_5 \cdot (2)^5 \cdot (\sqrt{2})^5$$

$$= \frac{\cancel{10}^{2} \cdot 9 \cdot 8 \cdot 7 \cdot \cancel{6}^{2}}{1 \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{4} \cdot \cancel{5}} \cdot 2^{\cancel{5}\,4} \cdot 4\sqrt{2}$$

$$= 9 \times 56 \times 2^6 \sqrt{2}$$

Q

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Q Find for $(2-3x)^{15}$

A) Find T_7

$T_7 = {}^{15}C_6 (2)^9 (-3x)^6$

(B) Find Bi. Coff. of T_7

${}^{15}C_6$

(C) Find Coff of T_7

$= \underbrace{{}^{15}C_6 \cdot 2^9 (-3)^6}$

(D) Sum of Coff $= (2-3\times1)^{15}$

var $= 1$ $\qquad = -1^{15} = -1$

(E) Middle Term. $n = 15 = 2$ M.T.

$T_{\frac{15+1}{2}}$ & $T_{\frac{15+3}{2}}$

T_8 & T_9

$T_8 = {}^{15}C_7 (2)^8 (-3x)^7$

$T_9 = {}^{15}C_8 (2)^7 (-3x)^8$

(F) No. of terms $= 15+1 = 16$

(G) Σ Notation $\Rightarrow$

$(2-3x)^{15} = \sum_{r=0}^{15} {}^{15}C_r (2)^{15-r} (-3x)^r$

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Q $\sum_{r=0}^{16} {}^{16}C_r (2)^{16-r}(-3)^r = ?$

$= (2-3)^{16}$

$= (-1)^{16} = 1$

Q $\sum_{r=0}^{10} {}^{10}C_r (2)^{10-r}(-\sqrt{2})^r = ?$

$= (2-\sqrt{2})^{10}$

Q $\sum_{r=0}^{10} {}^{10}C_r (-\sqrt{2})^r = ?$

$\sum {}^{10}C_r \cdot (1)^{10-r}(-\sqrt{2})^r$

$= (1-\sqrt{2})^{10}$

Q $\sum_{r=0}^{10} {}^{10}C_r = {}^{10}C_0 + {}^{10}C_1 + {}^{10}C_2 + \dots + {}^{10}C_{10} = 2^{10}$

$\sum {}^{10}C_r (1)^{10-r}(1)^r$

$= (1+1)^{10} = 2^{10}$

$= \underset{\sim}{1024}$

$\star$ $\sum_{r=0}^{n} {}^nC_r = {}^nC_0 + {}^nC_1 + {}^nC_2 + \dots + {}^nC_n = (1+1)^n$

$${}^nC_0 + {}^nC_1 + {}^nC_2 + \dots + {}^nC_n = 2^n$$

← Sum of Bi Coff ⟶

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Total No of terms.

① $(1-x)^{15} = 16$ terms

② $(\underbrace{1-2x+x^2}_{})^{15} = ?$

$((1-x)^2)^{15}$

$(1-x)^{30} \longrightarrow 31$ terms.

(3) $(1+2x+3x^2+x^3)^{10}$ No of ter.

$x^0 \qquad x^{30}$

$x^0 - 1 - 1 - \cdots - x^{30} = 31$ terms.

(4) $(x^1-3x^2+x^3)^{15}$

$x^{15} \qquad x^{45} = 31$ terms.

$(x^3)^{15}$

(5) $(1+x^2-x^4)^{10}$

$x^0 \qquad x^{40} = 20+1$

$= 21$ terms

(6) $(x+x^3-x^5)^{10}$

$x^{10} \qquad x^{50} = \frac{40}{2}+1$

$= 21$ terms

(6) $\left(x^3+2+\frac{1}{x^3}\right)^{10}$

$x^{30} \qquad x^{-30}$

$= \frac{60}{3}+1$

$= 21$ terms.