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Binomial Solutions=

$$1) T_{x+1} = \binom{10}{r} \left(\frac{a}{x}\right)^{10-r} \left(\frac{x}{a}\right)^r$$

$$\Rightarrow \binom{10}{r} a^{10-r} \cdot x^{-(10-r)} \cdot x^r \cdot a^{-r}$$

$$x^{-(10-r)+r}$$

$$\Rightarrow x^{2r-10} \rightarrow 2r-10=0$$

$$r=5$$

$$T_{x+1} \Rightarrow T_6 \Rightarrow T_6 \rightarrow B$$

$$2) T_{x+1} = \binom{n}{r} a^{n-r} \cdot b^r$$

Replace r with $r-1$

$$T_{r+1} = \binom{n}{r-1} a^{n-(r-1)} b^{r-1}$$

$$T_r = \binom{n}{r-1} a^{n-r+1} b^{r-1} \checkmark$$

3) Sum of coefficient asked, not Binomial Coefficient

$$(x-y)^n \Rightarrow (ax+by)^n \rightarrow \text{Coefficient} \Rightarrow (a+b)^n$$

$$\text{So } (1+(-1))^{10} \Rightarrow (0)^{10} \Rightarrow 0$$

4) option A $\Rightarrow 2^{10+1} \Rightarrow 2^{11} \Rightarrow 2048$
 option B $\Rightarrow 2^{10} \Rightarrow 1024$
 option C $\Rightarrow 2^9 \Rightarrow 512$ ✓

5) $(1-3x)^{\frac{1}{2}} (1+4x)^{-\frac{1}{2}}$

$$\Rightarrow (1-3x(\frac{1}{2})) (1-\frac{4x}{2})$$

$$2) (1-\frac{3x}{2}) (1-\frac{4x}{2}) \Rightarrow 1 - \frac{4x}{2} + \frac{3x}{2} + \text{neglected}$$

$$1 - \frac{7x}{2}$$

6) B

7) D

8) B

9) $(a)^{-3/2} (1+\frac{2}{9x})^{3/2}$

$$\downarrow$$

$$|y| < 1 \Rightarrow |\frac{2}{9}x| < 1 \Rightarrow |x| < \frac{9}{2}$$

10) D

$$11) nC_r + nC_{r-1} = n+1C_r$$

$$3C_2 + 3C_1 = 4C_2$$

$$4C_2 + 4C_3 + 5C_4 + 6C_5$$

$$\Rightarrow 5C_3 + 5C_4 + 6C_5$$

$$\Rightarrow 6C_4 + 6C_5 = 7C_5$$

$$12) \binom{4}{4} \Rightarrow \frac{4!}{(4-4)!4!} \Rightarrow 1$$

$$\binom{5}{4} \Rightarrow \frac{5!}{1 \cdot 4!} \Rightarrow 5$$

$$1+5=6$$

put $n=2$ in option check which gives 5

$$\binom{2}{4} \times$$

$$\binom{6}{5} \Rightarrow \frac{6!}{(6-5)!5!} = \frac{6 \times 5!}{1! \cdot 5!} \Rightarrow 6 \checkmark$$

$$\binom{3}{4} \times$$

option-c

13) Back Solve $3! > 3^2 \Rightarrow 6 > 3^2 \times$

$$2! > 2^2 \Rightarrow 2 > 2^2 \times$$

$$8 \cdot 4! > 4^2 \Rightarrow 24 > 16 \checkmark$$

$$\text{So } n > 3$$

14) $\frac{n(n+1)}{2}$ $\Rightarrow$ sum of First n natural numbers

$$\Rightarrow \frac{n^2+n}{2} \Rightarrow n^2+n \text{ is divisible by } 2$$

15) use Tril Concept

16) ncr

17) Theory Part in Q Series

18) $12+1=13$ total term
7th term middle

19) 33 total terms

17th term middle $\Rightarrow$ largest $\rightarrow 32 \leftarrow 17$

$$20) \frac{1+n \times \frac{n(n-1)}{2}}{21} \quad n \times \frac{1}{3} \Rightarrow x = \frac{1}{3n}$$

$$\frac{n(n-1)\left(\frac{1}{3n}\right)^2}{2!} = \frac{5}{36}$$

$$\Rightarrow \frac{n^2-n}{9n^2(2)} = \frac{5}{36} \Rightarrow 90n^2 - 36n^2 - 36n$$

$$\Rightarrow 54n^2 + 36n = 0$$

$$n(54n+36) = 0$$

$$n = \frac{-36}{54} \Rightarrow \frac{-6}{9} \Rightarrow \frac{-2}{3}$$

$$nx = \frac{1}{3} \Rightarrow \frac{-2}{3}(x) = \frac{1}{3} \Rightarrow x = -\frac{1}{2}$$

$$\Rightarrow (1+x)^n = y$$

$$\left(1 - \frac{1}{2}\right)^{\frac{2}{3}} = y$$

$$y^3 = \left(\left(1 - \frac{1}{2}\right)^{\frac{2}{3}}\right)^3 \Rightarrow \left(\frac{1}{2}\right)^2 = \frac{1}{2^2} \Rightarrow y = \frac{1}{2^2}$$

$$21) 13$$

$$22) (3+2-1)^2 \Rightarrow (4)^2$$

$$23) \text{ same as } 20$$

$$24) (-8)^3 \left(1 - \frac{23}{8}\right)^{-3} \Rightarrow \left|\frac{23}{8}\right| < 1$$

$$|x| < \frac{8}{2} \Rightarrow |x| < 4$$

25) - D

26) C

$$27) nC_r = nC_{n-r}$$

$$nC_{20} = nC_2$$

$$nC_5 = nC_{20}$$

$$nC_5 = nC_{n-20}$$

$$n-20=5 \rightarrow n=25$$

28) C, also remember $nC_r + nC_{r+1} = nC_{r+1}$ (net-2)

29) First=Last

2nd=2nd Last

3rd=3rd Last

$$30) \frac{2''}{(1-1)^0} \Rightarrow \frac{2''}{0} = \infty$$

Plus Three
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31) Try to concept

$$32) \frac{(n(n+1))^2}{2} \Rightarrow \text{Sum of Cubes}$$

$$\Rightarrow \frac{n^2(n+1)^2}{4} \text{ so 4 (B)}$$

$$33) 4^{\frac{1}{2}} \left(1 + \frac{1}{2}\right)^2 \Rightarrow 2 \left(1 + \frac{1}{2} + \frac{1}{2} \left(\frac{1}{2}\right) x^2\right)$$

Simplify