$T_{p+1} = \binom{n}{p} x^{n-p} y^p$

Colégio Imaculada

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5,9

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1º Verificação de Compl. Matemática

1) Calcule p em:

$C_{12,\,p+3} = C_{12,\,p-1}$

$\binom{12}{p+3} = \binom{12}{p-1}$

0,4

$p+3 = p-1$

$p+p = -1-3$

$2p = -4$

$\cancel{p = -2}$ //

$p+3+p-1 = 12$

$2p = 12+1-3$

$2p = 10$

$p = 5$ //

2) Calcule n em:

$A_{n,3} - C_{n,3} = 25 \cdot C_{n,\,n-1}$

$n(n-1)(n-2) - \frac{n!}{3!(n-3)!} = 25 \cdot \frac{n!}{(n-1)!(n-n+1)!}$

$n(n-1)(n-2) - \frac{n(n-1)(n-2)}{3 \cdot 2} \quad 25 \cdot \frac{n(n-1)!}{(n-1)!\,1!}$

$25n$ //

3) Calcule m em

$\sum_{i=1}^{m-1} \binom{m}{i} = 4094$

1,0

$\binom{m}{m-1} = \binom{m}{1}$

$\binom{m}{1} + \binom{m}{2} \dots \binom{m}{m-1}$

$m-1+1 = m$

$2^m - 1 + (-1) = 4094$

$2^m - 1 - 1 = 4094$

$2^m - 2 = 4094$

$2^m = 4096$

$2^m = 2^{12}$

$m = 12$ //

4) Determine o termo em x^{10} do desenvolvimento de $\left(x - \frac{1}{x}\right)^{20}$.

$\left(x - \frac{1}{x}\right)^{20}$

$T_{p+1} = \binom{20}{p} (x)^{20-p} \left(-\frac{1}{x}\right)^p$

$x^{20-p} \cdot x^{-p} = x^{10}$

$20 - p - p = 10$

$-2p = -10$

$2p = 10$

$p = 5$ //

$T_6 = \binom{20}{5} x^{15} (-x)^{-5}$

$T_6 = 15504\, x^{15} \cdot -x^{-5}$

$T_6 = 15504 \cdot -x^{10}$

$T_6 = -15504\, x^{10}$ //

1,2

Que posição ocupa este termo?

6º posição

5) Determine o coeficiente de x^{n+1} no desenvolvimento de

$(x+2)^n \cdot x^3$

$x^3(x+2)^n$

$T_{p+1} = \binom{n}{p} x^{n-p} 2^p$

( ) $2n - 1$

(.) $2n^2 - 1$

( ) $2n$

( ) $2(n+1)$

(X) n.d.a.

$x^{n-p} \cdot x^3 = x^{n+1}$

$n - p + 3 = n + 1$

$\cancel{n} - p + 3 - \cancel{n} - 1 = 0$

$-p = -2$

$p = 2$ //

$T_3 = \binom{n}{2} x^{n-2} \cdot 2^2$

1,3

$T_3 = \frac{n!}{2!(n-2)!} \cdot x^{n-2} \cdot 4$

$T_3 = \frac{n(n-1)\cancel{(n-2)!}}{2!\cancel{(n-2)!}} \cdot x^{n-2}\, 4$

$T_3 = \frac{n^2-n}{2} \cdot x^{n-2}\, x^2$

C

$T_3 = 2n^2 - 2n$

$T_3 = 2(n^2 - n) = 2n(n-1)$ certo

6) Calcule os valores de a e b sabendo que:

$$\begin{cases} a^5 - 10a^4 + 40a^3 - 80a^2 + 80a - 32 = 243 \\ 16a^4 + 32a^3b + 24a^2b^2 + 8ab^3 + b^4 = 81 \end{cases}$$

$$\begin{cases} (a-2)^5 = 243 \\ (2a+b)^4 = 81 \end{cases}$$

$a - 2 = \sqrt[5]{3^4} \Rightarrow a - 2 = 3^{4/5} \Rightarrow a = 3^{4/5} + 2$

$2a + b = \sqrt[4]{3^3} \Rightarrow 2a + b = 3^{3/4}$

$2(3^{4/5} + 2) + b = 3^{3/4}$

8) $\sum_{p=1}^{8} \binom{p+5}{p} = \binom{6}{1} + \binom{7}{2} + \binom{8}{3} + \binom{13}{8}$

( ) $\binom{14}{8}$

(X) $\binom{14}{6} - 1$

( ) $\binom{13}{8} - 1$

( ) $\binom{14}{7} - \binom{15}{8}$

( ) n.d.a.

10

9) Sabendo que no desenvolvimento de $(x+a)^n$ são iguais os coeficientes do 6º e 20º termos, determine n.

$(x+a)^n$

$T_6 = \binom{n}{5} x^{n-5} a^5$ / $T_{20} = \binom{n}{19} x^{n-19} a^{19}$

$\binom{n}{5} \cdot a^5 = \binom{n}{19} \cdot a^{19}$

$\frac{\binom{n}{5}}{\binom{n}{19}} = \frac{a^{19}}{a^5}$

$\frac{\binom{n}{5}}{\binom{n}{19}} = a^{14}$

$\frac{\frac{n!}{5!(n-5)!}}{\frac{n!}{19!(n-19)!}} = a^{14}$

$\frac{1}{\frac{1}{19!}} = a^{14}$

$19! = a^{14}$

$\boxed{n = 24}$

Boa sorte!
Eliany

7) Calcule.

a) $\sum_{p=0}^{9} \binom{9}{p} (-1)^p = (1 + (-1))^9 = (1-1)^9 = 0^9 = 0$

$\binom{9}{0}(-1)^0 + \binom{9}{1}(-1)^1 \ldots \binom{9}{9}(-1)^9$

10

b) $\sum_{i=6}^{11} \binom{i}{5} = \binom{6}{5} + \binom{7}{5} + \binom{8}{5} + \binom{9}{5} + \binom{11}{5}$

$\binom{12}{6} - \binom{5}{5}$

$924 - 1 = 923$