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Disciplina: **Matemática**

IFSP - Câmpus Cubatão

Tarefa Básica 3

Teorema do Binômio

(Fotos nas páginas seguintes)

Exercício 1:

Tarefa Básica 3

1-) $(1 + 2x^2)^6$, coeficiente de x^8?

↳ Lista 6

$$\binom{n}{k} \cdot x^{n-k} \cdot a^k \Rightarrow \binom{6}{k} \cancel{1}^{6-k} \cdot (2x^2)^k \Rightarrow \binom{6}{k} \cdot 2^k \cdot (x^2)^k$$

$\therefore$

$$\therefore\ 2k = 8 \Rightarrow \boxed{k=4} \Rightarrow \binom{6}{4} \cdot 2^4 \cdot (x^2)^4 \Rightarrow \left(\frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot (6-4)!}\right) \cdot 2^4 \cdot x^8 = \therefore$$

$$\therefore \left(\frac{30}{2 \cdot 1}\right) \cdot 16 \cdot x^8 = 15 \cdot 16 \cdot x^8 \Rightarrow \boxed{240x^8} \Rightarrow \text{Letra C.}$$

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Exercício 2 e 3 (parte 1):

2-) Soma dos coeficientes de $(14x-13y)^{237}$ é:

$$(14-13)^{237} \Rightarrow 1^{237} = \boxed{1} \rightarrow \text{Letra B}$$

3-) $(x+a)^{11} = 1386x^5$, $a = ?$

$$\binom{11}{k} \cdot x^{11-k} \cdot a^{k} \Rightarrow \binom{11}{6} x^{5} \cdot a^{6} = 1386x^{5} \Rightarrow \binom{11}{6} \cdot \frac{\cancel{x^5}}{\cancel{x^5}} \cdot a^{6} = 1386 \therefore$$

$11-k=5$

$11-5=k$

$\boxed{k=6}$

$$\therefore \binom{11}{6} a^{6} = 1386 \Rightarrow \frac{11!}{6!\,5!} \cdot a^{6} = 1386 \Rightarrow$$

página seguinte $\Rightarrow$

Exercício 3 (parte 2):

$$\frac{11.10.9.8.7.\cancel{6!}}{\cancel{6!}.5.4.3.2.1} \cdot a^{6} = 1386 \Rightarrow \frac{5544\cancel{0}}{12\cancel{0}}\, a^{6} = 1386 \Rightarrow 462a^{6} = 1386 \therefore$$

$$\therefore a^{6} = \frac{1386}{462} \Rightarrow a^{6} = 3 \Rightarrow \boxed{a = \sqrt[6]{3}} \rightarrow \text{Letra A.}$$

Exercício 4 e 5:

4-) $\left(x+\frac{1}{x^2}\right)^9 \Rightarrow (x-(1\cdot(x^2)^{-1})^9 \Rightarrow (x-(1\cdot x^{-2})^9$ ∴

↳ Sinal 9 ⇒ Termo independente = 0

∴ $\binom{9}{k} \cdot x^{9-k} \cdot (-x^{-2})^k$ ✓

$9-k-2k=0$

$9-3k=0$

$9=3k \Rightarrow \boxed{k=3}$

$k=9/3$

$\boxed{\binom{9}{3}}$ → letra D

5-) $\left(x+\frac{1}{x^2}\right)^n$, termo independente de x?

$(x-(x^2)^{-1})^n \Rightarrow \binom{n}{k} \cdot x^{n-k} \cdot (-x^{-2})^k$

$n-k-2k=0$

$n-3k=0$

$n=3k$

$\boxed{\frac{n}{3}=k} \Rightarrow \boxed{\frac{n}{3}=k}$ → letra C.

↳ Se n for divisível 3, ele tem que ser $=k$.

Exercício 6 e 7:

6-) $K = \left(3x^3 + \frac{2}{x^2}\right)^5 - \left(243x^{15} + 810x^{10} + 1080x^5 + \frac{240}{x^5} + \frac{32}{x^{10}}\right) \begin{cases} x = 10 \\ x \neq 0 \end{cases}$

$K = ?$

$\Rightarrow \left(\binom{5}{0}\cdot(3x^3)^5\right) + \left(\binom{5}{1}\cdot(3x^3)^4\cdot\left(\frac{2}{x^2}\right)\right) + \left(\binom{5}{2}\cdot(3x^3)^3\cdot\left(\frac{2}{x^2}\right)^2\right) + \left(\binom{5}{3}\cdot(3x^3)^2\cdot\left(\frac{2}{x^2}\right)^3\right) + \therefore$

$\therefore \left(\binom{5}{4}\cdot 3x^3\cdot\left(\frac{2}{x^2}\right)^4\right) + \left(\binom{5}{5}\cdot\left(\frac{2}{x^2}\right)^5\right) = \therefore$

$\therefore = \left(\cancel{243x^{15}} + \cancel{810x^{10}} + \cancel{1080x^5} + 720 + \left(\cancel{\frac{240}{x^5}}\right) + \left(\cancel{\frac{32}{x^{10}}}\right) - \left(\cancel{243x^{15}} + \cancel{810x^{10}}\right.\right. \therefore$

$\therefore + \cancel{1080x^5} + \left(\cancel{\frac{240}{x^5}}\right) + \left(\cancel{\frac{32}{x^{10}}}\right) = \boxed{720}$ m

$\hookrightarrow \boxed{720} \Rightarrow$ Letra E.

7-) $(2x+y)^5$, soma dos coeficientes é ?

$(2+1)^5 \Rightarrow 3^5 = \boxed{243}$ m $\Rightarrow$ Letra C.