Exercícios

① $(1+2x^2)^6 \rightarrow \binom{6}{k} 1^{6-k} \cdot (2x^2)^k = \boxed{?}\, x^8$ ©

$2k = 8$
$k = 4$ $\rightarrow \binom{6}{4} \cdot 1^2 \cdot (2x^2)^4 = \frac{6!}{4!\,2!} \cdot 1 \cdot 16x^8 = 15 \cdot 16x^8 = 240x^8$

② $(14x - 13y)^{237} \rightarrow (14 - 13)^{237} = 1^{237} = \boxed{1}$ B

③ $(x+a)^{11} = 1386x^5$

$\binom{11}{k} \cdot x^{11-k} \cdot a^k = 1386x^5 \rightarrow 11 - k = 5 \rightarrow k = 6$

$\binom{11}{6} \cdot x^5 \cdot a^6 = 1386x^5 \rightarrow \binom{11}{6} = \frac{11!}{6!\,5!} = 462$

$462 \cdot x^5 \cdot a^6 = 1386x^5$

$a^6 = \frac{1386\cancel{x^5}}{462\cancel{x^5}}$

$a^6 = 3$

$a = \sqrt[6]{3}$

A

④ $\left(x + \frac{1}{x^2}\right)^9 \to \binom{9}{k} \cdot x^{9-k} \cdot \left(\frac{1}{x^2}\right)^k = x^0$

$\hookrightarrow (x^{-2})^k$

$9 - k - 2k = 0$

$9 - 3k = 0 \to \binom{9}{3}$ Ⓓ

$k = 3$

⑤ Apenas haverá termo independente se n for divisível por 3, para que k seja dos números naturais.

$\left(x + \frac{1}{x^2}\right)^n \to \binom{n}{k} \cdot x^{n-k} \cdot \left(\frac{1}{x^2}\right)^k = x^0$

$n - k - 2k = 0$

$n = k3$ Ⓒ

$k = \frac{n}{3} \in \mathbb{N}$

$\exists$ termo independente

⑥ $\left(3x^3 + \frac{2}{x^2}\right)^5 - \left(243x^{15} + 810x^{10} + 1080x^5 + \frac{240}{x^5} + \frac{32}{x^{10}}\right) = k$

$\left(3x^3 + \frac{2}{x^2}\right)^5 = 1 \cdot (3x^3)^5 \cdot \left(\frac{2}{x^2}\right)^0 + 5 \cdot (3x^3)^4 \cdot \left(\frac{2}{x^2}\right)^1 + 10(3x^3)^3 \cdot \left(\frac{2}{x^2}\right)^2 +$

$10 \cdot (3x^3)^2 \cdot \left(\frac{2}{x^2}\right)^3 + 5 \cdot (3x^3)^1 \cdot \left(\frac{2}{x^2}\right)^4 + 1 \cdot (3x^3)^0 \cdot \left(\frac{2}{x^2}\right)^5$

$= 243x^{15} + 810x^{10} + 1080x^5 + 720 + \frac{240}{x^5} + \frac{32}{x^{10}}$

$k = \cancel{243x^{15}} + \cancel{810x^{10}} + \cancel{1080x^5} + 720 + \cancel{\frac{240}{x^5}} + \cancel{\frac{32}{x^{10}}} - \cancel{243x^{15}} - \cancel{810x^{10}} - \cancel{1080x^5} - \cancel{\frac{240}{x^5}} - \cancel{\frac{32}{x^{10}}}$

$k = 720$ Ⓔ

data
fecha

D S T Q
D L M M

⑦ $(2x+y)^5 \to (2+1)^5 = 3^5 = \boxed{243}$

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