Tarefa básica

TEOREMA DO BINÔMIO

① $(1+2x^2)^6$, coeficiente de x^8?

↳ linha 6 $\binom{6}{K} 1^{6-K} . (2x^2)^K = x^8$

$\binom{6}{K} 1^{6-K} . 2^K . x^{2K} = x^8$

$2K = 8 \rightarrow K = 4$

$\binom{6}{4} 1^{6-4} . 2^4 . x^{2.4} \rightarrow \frac{6.5.\cancel{4}.\cancel{3}}{\cancel{4}.\cancel{3}.2.1} . 1^2 . 16 . x^8 \rightarrow \frac{30}{2} . 16x^8$

$15 . 16x^8$

Alternativa C $\rightarrow 240x^8$

② $(14x - 13y)^{237}$, $x = 1$, $y = 1$

Soma $\rightarrow (14-13)^{237} = 1^{237} = 1$

Alternativa B

③ $(x+a)^{11} = 1386x^5$

↳ linha 11 $\binom{11}{K} x^{11-K} . a^K = 1386x^5$

$11 - K = 5$

$K = 6$

Alternativa A

$\binom{11}{6} x^{11-6} . a^6 = 1386x^5$

$\frac{11.10.9.8.7.\cancel{6}}{\cancel{6}.5.4.3.2.1} . \cancel{x^5} . a^6 = 1386\cancel{x^5}$

$\frac{5544\cancel{0}}{12\cancel{0}} a^6 = 1386 \rightarrow 462a^6 = 1386$

$\rightarrow a^6 = \frac{1386}{462}$

$a^6 = 3$

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

tilibra

④ $\left(x + \frac{1}{x^2}\right)^9 \rightarrow \left(x + x^{-2}\right)^9$, termo independente $= x^0$

↳ linha 9 $\binom{9}{k} 1^{9-k} . (x^{-2})^9 = x^0$

$$9 - k - 2k = 0$$
$$3k = 9$$
$$k = 3$$, ou seja, $\binom{9}{3}$ Alternativa D

⑤ $\left(x + \frac{1}{x^2}\right)^n \rightarrow (x + x^{-2})^n$, termo independente $= x^0$

↳ linha n $\binom{n}{k} . x^{n-k} . (x^{-2})^k = x^0$

$$n - k - 2k = 0$$
$$3k = n$$
$$k = \frac{n}{3}$$ → n é divisível por 3

Alternativa C

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

$(3x^3 + 2x^{-2})^5 = \binom{5}{0} . (3x^3)^5 (2x^{-2})^0 + \binom{5}{1} (3x^3)^4 (2x^{-2})^1 + \binom{5}{2} (3x^3)^3 (2x^{-2})^2 + \binom{5}{3} (3x^3)^2 (2x^{-2})^3$

$\binom{5}{4} (3x^3)^1 (2x^{-2})^4 + \binom{5}{5} (3x^3)^0 (2x^{-2})^5$

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

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

$K = 720$ Alternativa E

(7) $(2x+y)^5$, $x=1$, $y=1$

soma $\rightarrow$ $(2+1)^5 = 3^5 = 243$

alternativa c