Beatriz Miranda Bezerra

Teorema do Binômio

① $(1+2x^2)^6 \rightarrow T_{k+1} = \binom{6}{k} \cdot 1^{6-k} \cdot (2x^2)^k$

$2k = 8$
$k = 8/2$
$k = 4$

$T_{k+1} = \binom{6}{k} \cdot (2x^2)^k$

$T_5 = \binom{6}{4} \cdot (2x^2)^4 = \frac{6\cdot 5}{2} \cdot 16 \cdot x^8 = 15\cdot 16 \cdot x^8 = \boxed{240\cdot x^8}$ (C)

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

③ $(x+a)^{11} = 1386x^5$

$x^{11-k} = x^5$
$11-k = 5$
$k = 6$

$T_{k+1} = \binom{n}{k} x^{n-k} \cdot a^k$

$T_{k+1} = \binom{11}{k} x^{11-k} a^k$

$T_7 = \binom{11}{6} x^5 a^6 \rightarrow 1386 = \binom{11}{6} a^6 = \frac{11\cdot 10\cdot 9\cdot 8\cdot 7}{5\cdot 4\cdot 3\cdot 2} a^6$

$1386 = 462a^6 \rightarrow a^6 = \frac{1386}{462} \rightarrow a^6 = 3 \rightarrow \sqrt[6]{a^6} = \sqrt[6]{3}$

$\therefore \boxed{a = \sqrt[6]{3}}$ (A)

④ $\left(x+\dfrac{1}{x^2}\right)^9 = (x+x^{-2})^9$

$$9-k-2k=0$$
$$9-3k=0$$
$$k=9/3$$
$$k=3$$

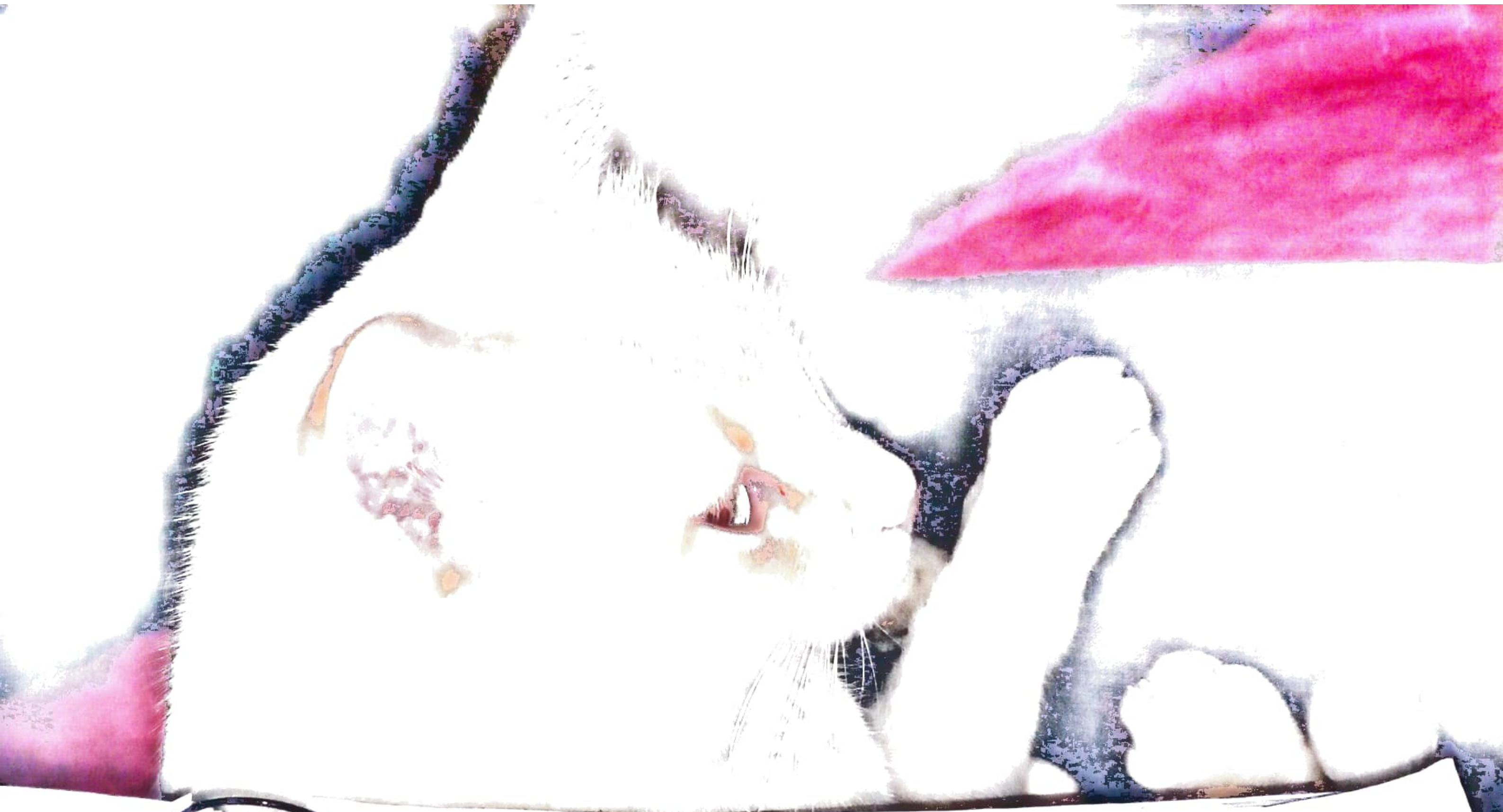
$$T_{k+1}=\binom{9}{k}\cdot x^{9-k}\cdot (x^{-2})^k$$

$$T_4=\binom{9}{3}\cdot x^6\cdot (x^{-2})^3=\binom{9}{3}\cdot\cancel{x^6}\cdot\cancel{x^{-6}}=\binom{9}{3}\quad (D)$$

⑤ $\left(x+\dfrac{1}{x^2}\right)^m=(x+x^{-2})^m \quad T_{k+1}=\binom{m}{k}x^{m-k}(x^{-2})^k$

$m-k-2k=m-3k=0 \rightarrow k=m/3$ $\therefore$ Para que $k\in\mathbb{N}$, m deve ser divisível por 3

(C)



6 $(3x^3+2x^{-2})^5 = \binom{5}{0}(3x^3)^5(2x^{-2})^0 + \binom{5}{1}(3x^3)^4(2x^{-2})^1 + \binom{5}{2}(3x^3)^3(2x^{-2})^2 +$

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

$243x^{15} + \frac{810}{x^2} + \frac{1080x^9}{x^4} + 720 + \frac{240x^2}{x^8} + \frac{32}{x^{10}}$

termo independente (e)

7 soma dos coeficientes $(2x+y)^5$ se $x=1$ e $y=1$

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