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Turma: CTII 348

Tarefa Básica - Teorema do Binômio

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

$2k = 8 \rightarrow k = 8/2 = 4$

(C)

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

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

$(1)^{237} = 1$ (B)

3- $(x+a)^{11}$, um dos termos $= 1.386x^5$, o valor de a?

$T_{k+1} = \binom{n}{k} x^{n-k} a^k$ $\Big\{$ $T_{k+1} = \binom{11}{k} x^{11-k} a^k \rightarrow x^{11-k} = x^5$

$11 - 5 = k = 6$

$T_7 = \binom{11}{6} x^5 a^6$ $\Big\}$ $1.386 = \binom{11}{6} a^6 = \frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7}{5 \cdot 4 \cdot 3 \cdot 2} a^6$

$1386 = 462a^6 \rightarrow a^6 = 1386/462 = 3 \rightarrow a^6 = 3$

$\sqrt[6]{a^6} = \sqrt[6]{3} \rightarrow a = \sqrt[6]{3}$ (A)

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

$T_{k+1} = \binom{9}{k} \cdot x^{9-k} \cdot (x^{-2})^k \rightarrow 9-k-2k=0 \rightarrow 9-3k=0$

$3k=9 \rightarrow k = 9/3 = 3$

$T_4 = \binom{9}{3} \cdot x^6 \cdot (x^{-2})^3 = \binom{9}{3} \cdot x^6 \cdot x^{-6} = \binom{9}{3} \cdot 1 = \binom{9}{3}$ (D)

5- $\left(x+\frac{1}{x^2}\right)^m = \left(x+x^{-2}\right)^m$

$m-k-2k = m-3k = 0$

$3k = m \rightarrow \boxed{k = \frac{m}{3}}$

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

Para que $k \in \mathbb{N}$, m deve ser divisível por 3 (C)

6- $\left(3x^3+\frac{2}{x^2}\right)^5 = \left(3x^3+2x^{-2}\right)^5 =$

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

$1(3x^3)^5(2x^{-2})^0 + 5(3x^3)^4(2x^{-2})^1 + 10(3x^3)^3(2x^{-2})^2 + 10(3x^3)^2$
$(2x^{-2})^3 + 5(3x^3)^1(2x^{-2})^4 + 1(3x^3)^0(2x^{-2})^5$

$243x^{15} + 810x^{12}x^{-2} + 1080x^9x^{-4} + 720 + 240x^3x^{-8} + 32x^{-10}$
$(243x^{15} + 810x^{10} + 1080x^5 + 720 + 240x^{-5} + 32x^{-10})$
$-(243x^{15} + 810x^{10} + 108x^5 + \qquad 240x^{-5} + 32x^{-10})$

$\frac{240}{x^5} = 240x^{-5}$ $\frac{32}{x^{10}} = 32x^{-10}$ $= 720$ (E)

7 - Soma dos coeficientes $(2x+y)^5$

Se $x=1$ e $y=1$ $\rightarrow$ $(2+1)^5$

$(3)^5 = 3\cdot3\cdot3\cdot3\cdot3 = 9\cdot3\cdot3\cdot3 = 27\cdot3\cdot3 = 81\cdot3$

$= 243$ (C)