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MATEMATICA

SEMANA 11

① $(1+2x^2)^6 \qquad x^8 = ?$

$\binom{6}{k} 1^{6-k} \cdot (2x^2)^k \rightarrow \binom{6}{k} 2^k x^{2k} \qquad 2k = 8$

$k = \frac{8}{2} = 4$

$\binom{6}{4} 2^4 x^8 = \frac{6!}{4!(6!-4!)} = \frac{6!}{4!\,2!} = \frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 2 \cdot 1} = 15 \cdot 16x^8 = 240x^8$

R: (C)

② $(14x - 13y)^{237}$

Se x e $y = 1$

$(14 \cdot 1 - 13 \cdot 1)^{237}$

$(14-13)^{237}$

$1^{237} = 1$

R: (B)

③ $(x+a)^{11} = 1386x^5, \quad a = ?$

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

$k = 6$

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

$\frac{11!}{6!\,(11!-6!)} = \frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot \cancel{6!}}{\cancel{6!} \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} a^6 = 1386$

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

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

$a^6 = 3$

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

R: (A)

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

$\binom{9}{k} x^{9-k} x^{-2k} = \binom{9}{k} x^{9-3k}$

$9-3k=0$

$-3k=-9$

$k=\frac{-9}{-3}$

R:(D) $k=3 = \binom{9}{3}$

⑤ Se $n=9$ acaba criando respostas independentes, assim é preciso ser divisivel por 3

R:(C)

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

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

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

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

R:(E)

⑦ $(2x+y)^5 = \binom{5}{0} 2x^5 \cdot y^0 + \binom{5}{1} 2x^{4} \cdot y^1 + \binom{5}{2} 2x^{3} + \dots \binom{5}{5} 2x^{0} \cdot y^5$

$\binom{5}{0}2^5+\binom{5}{1}2^4+\binom{5}{2}2^3+\binom{5}{3}2^2+\binom{5}{4}2^1+\binom{5}{5}2^0$

$2^5+5\cdot 2^4+10\cdot 2^3+10\cdot 2^2+5\cdot 2^1+1\cdot 2^0 = \underbrace{32+80+80+40+10+1}_{243} =$

R:(C)