TAREFA: TEORIA DO BINÔMIO

01: $(1+2x^2)^6$ $\quad x^8 = ?$

coeficiente do termo x^2

↳ linha 6

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

$2k = 8$

$\binom{6}{k} 2^k \cdot x^{2k}$ $\quad x,\ k = 0, 1 \ldots 6.$ $\quad k = 4$

$\binom{6}{4} 2^4 \cdot x^8 = \frac{6!}{4!\,2!} \cdot 16 \cdot x^8 \rightarrow \frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!}\, 2!} \cdot 16 \cdot x^8$

$\frac{6 \cdot 5}{2!} \cdot 16x^8 = \frac{30 \cdot 16x^8}{2!} = \frac{480x^8}{2!} = \frac{480x^8}{2} = 240x^2$

C

2: $(14x - 13y)^{237}$

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

03: $(x+a)^{11} = 1386x^5$

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

$11 - k = 5$

$k = 6$

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

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

$\frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6!}{6!5!} \cdot a^6 = 1386 \rightarrow \frac{55440}{120} \cdot a^6 = 1386$

$462a^6 = 1386$

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

$a^6 = 3$

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

R: A

04: $\left(x + \frac{1}{x^2}\right)^9$

$\binom{9}{k} x^{9-k} \cdot \left(\frac{1}{x^2}\right)^k \rightarrow \binom{9}{k} \cdot x^{9-k} \cdot (1)^k \cdot (x^{-2})^k$

$(1)^k \cdot \binom{9}{k} \cdot (x^{9-k}) \cdot x^{-2k} \rightarrow 1^k \cdot \frac{9}{k} \cdot x$

$9 - 3k = 0$
$9 = 3k$
$\frac{9}{3} = k$

R: D

05: $\left(x + \frac{1}{x^2}\right)^n$

$\binom{n}{p} x^{n-p} \cdot \left(\frac{1}{x^2}\right)^p \rightarrow \binom{n}{p} \cdot x^{n-p} \cdot (1)^p \cdot (x^{-2})^p$

$(1)^k \cdot \binom{n}{k} \cdot x^{n-k} \cdot x^{-2k}$

$n - 3k = 0$
$n = 3k$

C

07: $(2x + y)^5 = ?$ $x = 1$ $y = 1$

$(2.x + y)^5 = (2.1 + 1)^5 = 3^5 = 243$

R: C