- Julio Brandasse de Abreu Lima.

Teorema do Binômio.

Teorema do Binômio - Exercícios

- Julio Brandasse de Abreu Lima

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

1) $(1+2x^2)^6$ $? \cdot x^8$ = coeficiente: ???

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

$$\binom{6}{4} 2^4 \cdot x^8 = \frac{6!}{4!\,2!} \cdot 16 \cdot x^8 = 240x^8$$

Alternatica (C)

2) $(14x-13y)^{237} = (14.1 - 13.1)^{237} = 1^{237}$

$= 1$

$x=1, y=1$ então

Alternativa (B)

3) $(x+a)^{11}$; $1386x^5$, $a = ?$

$11-k=5$
$-k=5-11$
$(-1)\ -k=-6\ (-1)$
$k=6$

Linha(1) $= \binom{11}{k} x^{11-k} \cdot a^k$

$$\left[\binom{11}{6} \cdot x^{11-6} \cdot a^6 = 1386x^5\right]$$ proxima pagina

$\frac{11!}{6!(11-6)!} \cdot x^5 \cdot a^6 = 1386 x^5$

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

$462 a^6 = 1386 \longrightarrow 462$

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

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

= Letra A)

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

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

$T_{k+1} = \binom{9}{k} \cdot x^{9-3k}$

Alternativa (D)

$9 - 3k = 0$

$(-1)\ -3k = -9\ (-1)$

$3k = 9$

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

5. $\left(x+\frac{1}{x^2}\right)^n \longrightarrow T_{k+1} = \binom{n}{k} x^{n-k} \cdot \left(\frac{1}{x^2}\right)^k$

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

$$T_{k+1} = \binom{n}{k} x^{n-3k}$$

Resposta:

Na condição de que K seja verdadeiro, o mesmo deve pertencer ao conjunto dos números naturais. Porém, para que isso seja possível, o n deve ser divisível por 3.

$n-3k=0$

$n=3k$

$\boxed{k=\frac{n}{3}}$

Alternativa C

6)

Resposta: 720, alternativa E

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

$$\left(3x^3+\frac{2}{x^2}\right)^5=\binom{5}{0}\cdot(3x^3)^5+\binom{5}{1}(3x^3)^4\cdot\left(\frac{2}{x^2}\right)$$

$$+\binom{5}{2}\cdot(3x^3)^3\cdot\left(\frac{2}{x^2}\right)^2+\binom{5}{3}(3x^3)^2\cdot\left(\frac{2}{x^2}\right)^3+\binom{5}{4}\cdot(3x^3)$$

$$\cdot\left(\frac{2}{x^2}\right)^4+\binom{5}{5}\cdot\left(\frac{2}{x^2}\right)^5=243x^{15}+810x^{10}+1080x^5+\boxed{720}+\frac{240}{x^5}+$$

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

$+ \binom{5}{3}(2x)^2 \cdot y^3 + \binom{5}{4} 6x8y^2 + \binom{5}{5} y^5$

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

$\rightarrow 2^5 + 5.2^4 + 10.2^3 + 10.2^2 + 5.2 + 1 = 243$ //

Resposta: alternativa C